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SCHEMATA FOR READING OF GRADE ONE GOOD AND POOR READERS AND THE RELATIONSHIP TO THE CONCEPTS OF READING HELD BY THEIR PARENTS

by

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ABSTRACT

This study investigated the schemata for reading of grade one good and poor readers and the relationships to the concepts of reading held by their parents. The child sample, chosen by the results as indicated as percentile scores on the Metropolitan Reading Achievement Test, consisted of 10 high comprehenders and 10 low comprehenders from all the grade one classrooms within a surburban school district. The adult sample was comprised of 20 parents. The parent most involved with the child's school work was interviewed at home, the children at their respective schools. The researcher conducted all interviews which were tape-recorded and later transcribed. Two questionnaires, based on the model designed by Canney and Winograd (1979) were employed to provide data for analysis. The analysis proceeded in two stages: a) responses from each group to questions 1-14 were compared and analysed descriptively; b) responses to the main question "What is reading?" were coded by means of the t-unit into three focusses of reading--object, decoding and meaning--and then subjected to two and three-way analyses of variance.

The results did not demonstrate a strong relationship for reading concepts between parents and children. There were however, significant differences within the focusses of the reading concept held by parents and children. Furthermore, good and poor readers did not appear to possess similar schemata for reading. The good readers focussed more frequently on meaning than did their less able peers. Children, in general, were discoverd to place more emphasis on the decoding features of the task while their parents considered the process to be one of mental dialogue between author and reader. Although all subjects thought reading to be important, and good readers approached more accurately the adult conception of what reading is, the children in the study possessed a more restricted view of the process than did their parents.

Suggestions were also given for further studies which could involve additional methods of inquiry for exploring parents' and children's schemata for reading.

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CHAPTER I

INTRODUCTION

TOPIC

In 1937 Somerset Maugham wrote "The Verger". The short story centers around a church verger of 16 years' tenure who was discovered to be illiterate to the consternation of the fashionable vicar and chuchwardens. When asked for an explanation for this deficiency, the verger replied: "I went into service when I was twelve, sir. The cook in the first place tried to teach me once but I didn't seem to 'ave the knack for it, and then what with one thing and another I never seemed to have the time. I've never really found the want for it. I think an awful lot of these young fellows waste a rare lot of time readin' when they might be doin' something useful". Society has changed somewhat since the 1930's, no more evident than in the field of literacy. Today it is essential for children to learn to read, in order that they may function adequately in society. In 1958, Edwards stated that "teaching would be simplified if there were some means of looking inside a child's head and finding out what his idea is in his approach to reading" (p. 239). Research abounds concerning what methods of teaching reading should be used, what reading materials and activities should be employed, the age at which the child should be introduced to reading, the effects of the home environment on his learning capabilities, etc. Many children, however, complete grade one with less than expected reading achievement to the concern of their teachers and parents, and a cycle of testing their intelligence, their readiness, their motivation, together with a host of other factors, is initiated. Since the sixties, research has given consideration to the child's concept of reading, both as beginner and competent reader. The findings for the former have been somewhat conclusive. Beginning readers are often confused by the reading process and do not appear to have a true understanding that reading implies meaningful interpretation of the text. Current research has demonstrated that the act of reading is both a complex and highly abstract process, especially for the beginner (Clay, 1975; Goodman, 1968; Smith, 1971). However, for many beginners, this complex and abstract process does not seem to be an insurmountable challenge. They learn to read with ease and considerable enjoyment. In fact, by the end of grade one, the majority of children appear to have grasped the concepts central to a schemata for reading and are firmly launched towards a career of literacy.

A reading schema is developed in much the same way as development of schemata for eating or taking a bath (Canney and Winograd, 1979). Does the child develop reading schemata only as he starts to read or is this development nurtured during the preschool years? What effects do the models of reading he sees around him, i.e. his parents, have on this development? One may suggest that his views and understanding of 'what reading is' may be influenced by these models. If the child's schemata for reading contains features for 'meaningfulness' and 'pleasurableness', what acknowledgement is due to his parents if they also contain similar features in their schemata for reading? This study concerns itself, therefore, with children's and parents' schemata for reading.

THE PROBLEM

A man's home is his castle; it may well be more. There is evidence to show that a child's home environment is an important precondition for his success in school (Ware and Garber, 1976). These authors quote several studies carried out in England and the United States which demonstrated a high correlation between home environment variables and later academic achievement in school.

Canney and Winograd (1979) propose a schema theory of reading, suggesting that such a theory, is an effort to meld theories about the structure of knowledge with the conditions under which that knowledge is operative. They also suggest that children who are poor readers have developed inappropriate schemata for reading. Anderson et al (1976) contend that the meaning of a general term is tied to particular uses. Therefore, a child could have various understandings for reading which are tied to particular conditions and uses of reading. If the child does not see examples of pleasurable and/or meaningful reading in his environment, the development of inappropriate schemata for reading may be a by-product of his home environment. Even though the child may be read to by his parents, discussions about the story characters and questions concerning the plot may be lacking, inadvertently impeding the development of appropriate schemata for reading, i.e. that one brings

7

information to the text as well as taking information away. If as Waller (1977, p. 1) contends that "thinking is a necessary prerequisite for reading at any level (beginning or mature), for any of its subparts (decoding or comprehension), and for any purpose (pleasure or information"), could the development for appropriate or inappropriate schemata for reading be, in part, a result of the home environment as parents provide examples of schemata for reading? This research, therefore, poses the basic question: what similarities exist between a child's schemata for reading and that of his parents?

PURPOSE OF THE STUDY

The purpose of this study is to investigate the schemata for reading of grade one good and poor readers and the relationship to the concepts of reading held by their parents.

DEFINITIONS

The following terms are defined to make explicit the study's frame of reference.

Poor Readers: Those grade one readers who performed at or below the 35th percentile on the Metropolitan Achievement Test, Primary I, Form F. The labels of poor readers and poor comprehenders are used synonymously.

Good Readers: Those grade one readers who performed at or above the 90th percentile on the Metropolitan Achievement Test, Primary I, Form

F. The labels of good readers and good comprehenders are used synonymously.

Schemata For Reading: Things or events which share features or 'slots' common to the event of reading, i.e. mental structures which have incorporated into a coherent dominant knowledge structure the subschema for graphophonic relationships, for syntactic and semantic constructions, for the materials used during reading and for the conditions under which reading can or cannot occur (Canney and Winograd, 1979).

T-unit: "A single independent (main clause) together with any subordinate clause that may be grammatically related to it. It may be a simple or complex sentence, but not a compound sentence" (Fagan, 1978, p. 201).

Object Focus: Responses which are object-related; reading is defined in relationship to the materials one uses to read with, such as 'reading is when you read a book' (Denny and Weintraub, 1965).

RESEARCH QUESTIONS

1. Do parents and grade one children differ in their concepts of reading?
2. Do the concepts of reading of poor readers in grade one differ from the concepts of good readers?
3. a) Do grade one good readers and their parents differ in their concepts of reading?
   b) Do grade one poor readers and their parents differ in their concepts of reading?

In addition to the above research questions for which data will be analysed statistically, the following questions will also be addressed, with descriptive data being presented to provide some answers.

1. Do parents and children like or dislike reading?
2. How often do parents and children read at home?
3. Do parents and children consider reading to be important?
4. At what age do parents and children think fluency in reading is attained?
5. Do parents and children observe others reading at home or in their environment?
6. How do parents and children rate themselves as readers?
7. What factors contribute to the inability to read of some adults and children?
8. What procedures would parents and children follow in order that they themselves might become better readers?
9. Do parents and children view the reading process to be the same for an adult as for a child in grade one?

HYPOTHESES*

1. There will be no interaction effects for the concepts of reading held by grade one children and their parents.
2. There will be no interaction effects for the concepts of reading held by good readers and poor readers in grade one.
3. There will be no interaction effects for the concepts of reading held by grade one good readers and their parents.

---

* Level of significance for rejection or non rejection of the hypotheses were set at $p < .05$..

3a. There will be no interaction effects for the concepts of reading held by grade one poor readers and their parents.

LIMITATIONS

1. Data from the children was collected in a school setting thereby inadvertantly focusing schemata for reading as a school based activity.
2. The children in the study may possess limited linguitic capabilities to verbalize what they really know and understand internally what reading is.
3. Some of the parents were known to the interviewer. The adults in the study may have provided information which they thought the interviewer, a teacher, may have wanted to hear, rather than what they really believed.
4. All responses to questions were tape recorded which may have heightened the level of anxiety for some of the participants, thereby contributing to a loss in the reliability and validity of the responses.
5. Only one parent from each family was interviewed -- the one most involved with the child's school work. A broader knowledge base could have been attained if both parents had participated. The short space of time for collecting data has therefore limited the amount of data gathered and its degree of reliability.

SIGNIFICANCE OF THE STUDY

Little if any empirical evidence exists on parents' concepts of reading. It is hoped that as a result of this study a broader understanding of the correspondence of the reading schemata of parents to the schemata for reading in their children may be added to the present body of reading research. The results of the study may help to answer such questions as: How do parents' schemata for reading relate to the schemata which their grade one children have acquired; if parents see meaning as central to reading, do their children also see meaning as the core of reading, even at this early stage of reading acquisition? Prior research seems to have focused primarily on the child's concepts of reading. This study will provide for a wider view and may be refined for further research.

Strang (1970) contends that several people are responsible for the successful development of reading of the child, and not just the teacher alone. Because parents occupy such a strategic position and because of the present day stress on parental involvement in education in general and reading in particular, this study provides further insight into the importance of parents as co-developers of the successful reader's achievement.

The study is also of theoretical interest as it blends the schema theory of knowledge acquisition with reading as a process event. Since schemata develop over time, a child learning to read is developing a schema for reading and the role his parent plays may not only be important, but vital to successful development.

OVERVIEW OF THE THESIS

Chapter II presents a review of the literature relevant to the purpose of the present study. Chapter III describes the research design employed in the study. The sample, procedure and data analysis are explained. The statistical findings are presented and discussed in Chapter IV. The descriptive data pertaining to questions 1-14 are presented and analysed in Chapter V. Chapter VI presents a general overview of the study, further discussion on the findings, the implications thereof and suggestions for further research.

CHAPTER II

SURVEY OF RELATED LITERATURE

The survey is presented in four sections. First, a review of schema theory and its relationship to the reading process provides the theoretical framework for the study. Second, research related to children's concepts for reading will be discussed. Third, a review of the limited data available on parents' (adults') reading habits will be presented, together with information on the influence of the home environment on children's reading. Finally, the fourth section will indicate how literature related to the present study provides a rationale for the research.

I. SCHEMA THEORY AND READING

Anderson (1977) refers to schemata as the "mental structures that incorporate general knowledge" (p. 2). Schemata contain certain slots or place holders for each of the particular pieces of information subsumed under the more general idea or structure. When the incoming message matches the slots in the schema, the information is said to be significant whereas when there is no matching, i.e. when the input does not fit a slot, the message is unimportant or irrelevant. When sufficient slots in a schema are filled, comprehension takes place.

Schemata are not isolated units; they may be embedded one within another, with a dominant schema containing many sub-schema. Although there is a relationship between the dominant schema and its subparts, some of the latter may be either more relevant or less central to the superordinate schema than others. An example may help to clarify this perspective.

> Every Saturday night, four good friends get together. When Jerry, Mike, and Pat arrived, Karen was sitting in her living room writing some notes. She quickly gathered the cards and stood up to greet her friends at the door. They followed her into the living room but as usual they couldn't agree on exactly what to play. Jerry eventually took a stand and set things up. Finally, they began to play. Karen's recorder filled the room with pleasant music. Early in the evening, Mike noticed Pat's hand and the many diamonds. As the night progressed the tempo of the play increased. Finally, a lull in the activities occurred. Taking advantage of this, Jerry pondered the arrangement in front of him. Mike interrupted Jerry's reverie and said "Let's hear the score." They listened carefully and commented on their performance. When the comments were all heard, exhausted but happy, Karen's friends went home.
> (Anderson, R.C. et al., 1977)

Depending on his dominant schema, the reader's interpretation of the above story may proceed in one or more of three ways: 1) he will not understand it at all, i.e. the information will match no slots within the schema; the data will be irrelevant or meaningless to him; 2) he will instantiate slots for a musical recital in his schema or 3) he will identify the information as a foursome for bridge. In the case of the latter, the incoming message - bridge - matches the slots of the purposes and rules of the game and understanding takes place. The reader must have an appropiate schema for bridge sufficiently developed. He understands the purpose of the game to be to contract accurately with a partner in order to win a certain number of tricks. The rules of the game include bidding according to the number of point-values in the player's hand, following suit during play, initiating play from the dummy hand when it has won the last trick, keeping accurate scores, and so forth. The reader may also be prepared to tolerate the musical interpretation if he has sufficient slots in that sub-schema necessary to accept an alternative view.

Reading itself, also is an activity which has its purposes and rules. The purposes could be for learning and enjoyment, while rules would involve starting to read at the top left-hand side of the page, continuing to the right, employing the decoding mechanisms necessary to decipher the print, etc. Understanding that the reader must bring meaning to the print is the nucleus of the reading act upon which appropriate schema for reading depend.

Schemata exist within a conceptual framework. Larger event structures are organized into scripts and contain all the relationships and functions of the object in the experiences of the individual. The dominant events "describe the interaction of a number of different concepts - people, places and things - organized around a goal... Knowledge of scripts for reoccurring events enables the child (or adult) to predict what, when and who in familiar situations" (Nelson, 1977, p. 222). As the individual becomes more familiar with the event structure, the concept in turn becomes less specific. This is evident when one is placed in a novel situation where actions and the results of those actions are quite idiosyncractic. Such an example may be seen in the beginner automobile driver. As experience with the wheel develops, the driver's schemata for road etiquette becomes more varied and general as to the what, who and when of the situation. The appropriate schemata for road-knowledge should contain slots for when to pass, the manner in which one passes, how much room to leave between oneself and other travellers, the changes needed to be considered due to road or weather conditions, etc.

Canney and Winograd (1979) suggest that a person learning to read is developing a schemata for reading in much the same way as the beginning driver is developing a schemata for road-etiquette. Subschema, related to the dominant schema for reading, include the graphophonic relationships, the syntactic rules, the semantic constructions, the materials used for reading and the situations under which reading can or cannot occur. As the individual becomes more familiar with reading situations, he constructs more general and salient slots common to the event of reading. Most of us would not dream of reading while attending a symphony performance. Such behavior is outside the reading situations we normally consider. We do know, however that the musicians and conductor are reading their scores while performing, which demonstrates that their schemata for reading includes slots for reading while playing. Reading a recipe while cooking, reading memos at one's desk at work, reading to a child in bed at night, reading to the teacher at school, etc. are situations most of us would consider common to the event 'reading'.

The young child encounters written language long before he personally demonstrates a need to communicate through print. The nursery-room wall-paper may be covered with the letters of the alphabet; he sees his father reading the newspaper, his mother a shopping list. Visits outside the home provide many examples of symbolic language; the big M for McDonalds, the Esso insignia, traffic signs, etc. Slowly but surely he becomes aware of print. He begins to recognize a favorite cereal on the shelves at the supermarket, the soft drink he prefers on T.V.; his favorite will be picked out from a group of books. For many children, the first steps towards literacy have been taken. They are building exeriences with print, developing schemata for reading.

Anderson (1977) suggests that general terms such as nouns do not have fixed meaning for the user. "Such terms have a family of meanings that are shaded by context" (p. 4). If as the author contends, the properties of a word shift from use to use, what is distinguishable in one situation may be unimportant, irrelevant or even absent in another. Canney and Winograd (1979) theorize that the term 'reading' also could have "several definitional and distinguishing properties" (p. 5) and that a student may have various meanings for reading which are tied to the particular conditions and uses under which he experiences reading. In other words, the child may have different scripts for reading which call for different behaviors. Given the varied settings in which reading takes place in his environment, having a book read to him at home, in the warmth and security of his bed may be viewed as a totally different behavior to reading to the teacher at school. In neither case is he expected to be an active participant in the reading process; his own efforts to derive meaning from the print are not central to his schemata for reading. Listening may be the home focus, decoding the emphasis at school. In neither location has he experienced sufficiently often that reading has as its purpose the communication of thoughts and feelings from the author to the reader.

Smith (1977) views reading as a 'top-down' process where the reader is viewed as a problem-solver, one who uses his conceptual and linguistic knowledge to form hypotheses about what he reads, and by analysing the print confirms, adjusts or rejects these hypotheses. In 'bottom-up' processing, the reader is considered an analytic processor of print whereby the information from the page is analysed through a series of low-level to higher-level order stages (Laberge and Samuels, 1974). The reader perceives the print and associates the letters, letter clusters and words with those stored in his lexicon. When automatic processing at the lower-level stage is attained, the reader progresses to the higher-level processes of comprehension. Rummelhart (1977) proposes an interactive model of reading whereby top-down and bottom-up processes are not seen dichotomously but as flowing in either direction depending on the needs and purposes of the reader. Comprehension takes place when information from all levels is synthesized.

Suppose the child has schematized reading as something that is done to him rather than an activity in which he becomes personally involved; suppose his encounters with print have been that of a passive participator, where he responds mechanically to the graphic stimuli without the realization that the print brings a message; suppose he does not know that he is expected to bring meaning to the text and just waits for the story to unfold rather than predicting or anticipating what the author is going to present. The schemata for reading for such a child may well lack slots for meaning-getting.

Complex skills cannot be taught by simply having the learner watch someone else perform. It appears to be taken for granted that if parents read to their children, appropriate schemata for reading will develop in their offspring. The assumption is, of course, that such reading episodes provide for dialogue on the part of the child. Doake (1977) contends that it is the type of interaction which is important rather than just the reading of the story. Some children from book-centered homes, with parents who read to them and provide themselves as models of reading, may not achieve success in reading at school. The reading episodes in these particular homes may not have demonstrated the concept that meaning is central to reading; they may have failed to generate the idea of the importance of top-down as well as bottom-up processing. The child from such an environment will not have grasped that he must make sense of the text. It is possible, therefore, that he will have developed inappropriate schema for reading and will view listening to the bedtime story or decoding at school as events central to a definition for reading, rather than as a means to promote the development of reading proficiency.

II. CHILDREN'S CONCEPTS OF READING

It would appear important to discover and understand a beginning reader's perception of reading. Understanding one concept is a prerequisite before a child can apply or integrate into his schemata a new concept. Learning is a process of expanding or broadening present concepts and integrating existing conceptualizations with new information (Nelson, 1977). It seems reasonable, therefore, to suppose that if a child does not have an adequate schema of concepts of what reading is, that getting meaning from the print is the purpose for reading, he will experience difficulty in learning to read. A considerable body of research exists which deals with children's concepts of reading.

Recent studies have investigated children's descriptions of what reading is (Edwards, 1968; Johns, 1972; Johns and Ellis, 1976; Denny and Weintraub, 1965). The linguistic rules of reading as perceived by children have been investigated by Reid (1966), Downing, (1970), Clay (1972) and Glass and Burton (1973). Purposes for reading from the child's point of view have been analysed by Edwards (1962), Muskhoph (1962) and McLaughlin, (1978). Tovey (1976) explained children's understanding of four psycholinguistic concepts. How good and poor readers view the reading process has been investigated by Goodman, (1967), Golinkoff, (1975) and Glass and Burton, (1973). The research pertaining to the present study is discussed below.

Children's Descriptions of Reading

Edward (1958) in his study, focused on the concept of reading as an activity. A special group of 66 retarded readers, in second and fourth grades, normal to superior in intelligence and physique, were members of a group scheduled for two remedial reading classes each week. Three questions, introduced casually as an extension of the current topic of conversation, were presented in group interviews on a weekly basis. The questions all related to the term 'good reading' as perceived by the subjects when they were begining readers. The resulting definitions were very consistent in spite of the time delay in their presentation. 'Good reading' was conceptualized as "not bumpy", "no stops and not jerky", in the majority of cases. The researcher's explanation for the responses centered around the child's motivation for social acceptance. He claimed that the subjects viewed reading as an activity which involves speed rather than meaning, in order to sound like an adult. Some criticism of the research is merited. No attempt was made to analyse the responses individually together with the fact that group interviews may have affected the responses of those involved. In the present study the subjects were interviewed individually and the researcher attempted to avoid the leading and specific word 'good' in the question "what is reading"? All questions were presented at one sitting in order to provide a more natural flow to the conversation. The present opinions of the subjects rather than their past experiences were one of the main objectives of the study.

In order to determine the possible relationship between children's concepts of reading and reading achievement, Johns and Ellis (1976) involved 1,600 students attending grades one to eight. Interviewed individually, the investigators asked three questions: 1) What is reading; 2) What do you do when you read; and 3) If someone didn't know how to read, what would you tell him/her that he/she would need to learn. Responses were recorded on audiotape, analysed and classified into one of five ranked categories: category one...I don't know, or vague circular or irrelevant responses; category two...responses involving classroom procedures; category three...responses concerned with word recognition and decoding; category four...responses which defined reading as a process of obtaining meaning from words or understanding a story; category five...responses which referred to both decoding and meaning. The results reported that 69% of the students gave meaningless or vague answers to the question "what is reading?" Fifteen per cent had responses classified in categories four and five, the majority belonging to students in grades seven and eight. Fifty-five per cent of the responses to question two were also classified as meaningless, while only 21%, including students from grade three up, referred to meaning getting. For the third question, 37% provided meaningless responses; only 8% referred to meaning. However, 56% considered word attack skills as central to reading. The conclusions of the researchers indicated that as many as 69% of the students had little or no understanding of the reading process although older students appeared to have a better understanding than younger students. Most of the meaning responses described reading as a decoding process which they further described as something which involved a text book.

Perhaps one must consider the decline in meaningless responses across the three questions in the above study, 69% to 37%. Could there have been a carry-over effect from one question to another? Each basically deals with the same central thought "What is reading?" In the present research, only the last question specifically asks "What is reading?" Little prior information could be supplied from the other questions, although each deals with reading per se. It is supposed that the carry-over effect from questions 1-14 to the key question 15 (see Appendix A), would be minimal, and then only as a vehicle for focus on the topic of reading. Also as Canney and Winograd (1979) suggest in their analysis of the Johns and Ellis (1976) study, "to respond meaningfully to one or more of the questions may not have been a valid indication of the subject's schemata for reading" (p. 17).

Denny and Weintraub (1963) conducted a longitudinal study with 111 children in five grade one classrooms. Subjects were interviewed individually with responses to the question "What is reading?", being taped. The responses were classified in seven ways: 1) no response; 2) unclear; 3) cognitive, i.e. reading to learn things; 4) object related; 5) valuative, i.e. good or bad; 6) mechanical, i.e. words and sounds; and 7) expectations, i.e. something we have to learn to do. Sixty per cent of the subjects' responses were either unclear or object-related. Another 20% defined reading as a process for learning new information. The final 20% were evenly distributed across the other three categories, valuative, mechanical or expectation.

The sample of students were again interviewed by Denny and Weintraub in 1966, with results from two additional questions being reported. For the second question "What must you do to learn to read in first grade?" slightly more than one-third of all responses given offered no meaningful explanation. Two-fifths indicated a "passive type of obedience" and only 37% were responses for which children saw themselves as taking some action in the reading process. The researchers emphasized that one-quarter of the children could express absolutely no logical reason for learning to read. They conclude their report with the suggestion:

> Most research on learning to read supports the proposition that it helps the child to learn if he knows the reason for a learning situation and sees a purpose in the task (p. 446).

In relation to this study, again one wonders if three questions are sufficient to give an accurate description of a child's concept of reading. Questions pertaining to the purposes of reading, the understanding a child may have of his own success or failure in reading, etc. are absent in the longitudinal study just discussed. In the research central to this thesis, a more detailed and varied questionnaire was employed to ascertain children's concepts of reading (See Appendix A).

Using the interview method, Mason (1967) questioned 178 three to five year olds. Four areas were covered: 1) Do you like to read? Can you do it all by yourself?; 2) Does anyone in the family read?; 3) Would you like to be able to read?; 4) Do you like _______ to read? The findings from questions 1-3 appear to contradict in part some of the studies reported above. Over 90% believed they could read before they went to school, and more important, they liked what they were doing. Since these children could not read, Mason contended that perhaps one of the first steps in learning to read is realizing that one does not know how to read. Markham (1977) concurs as a result of a study with first and third graders in which instructions were made obviously incomprehensible by deleting information needed to understand how to perform the task. Grade one children were not able to notice the inadequacies and had to be urged to perform the tasks before becoming aware of the missing information.

Linguistic Rules of Reading

Reid (1966) investigated the perceptions of reading and writing held by 12 Scottish five year olds in their first year of formal schooling. Each subject was interviewed three times during the year; open-ended questions were designed to elicit responses concerning concepts of books, words, what makes reading hard, methods of word attack, etc. In viewing the results, the author concluded that the subjects perceived reading "as a mysterious activity to which they come with only the vaguest of expectations" (p. 60). By the end of the first year, most of the children had not formed concepts of written words as being composed of letters and did not appear to have realized that written words had any relationship to speech or meaning.

In 1970, Downing replicated and extended the Reid (1966) study with 13 five year olds in England. The findings supported Reid's conclusions. Children had great difficulty in understanding the technical and abstract terms of word, letter and sound. The present study avoided asking the child sample for definitions of linguistic terms, but phrased the questions in such a manner that the children might use them if they were part of their natural vocabulary; e.g. Is reading hard for you? Why? It was assumed that as the children had had eight months of formal reading instruction, they might use the technical terms and demonstrate their understanding of them in a conversational setting, even if they could not give definitional properties for the same terms in isolation.

Clay (1972) designed a concepts for reading test entitled The Sand Test which sought to assess the linguistic components of reading. Presented with the book Sand, a child could demonstrate where to start reading, where to start reading a page, what direction he must take to follow continuous discourse, whether one reads print or pictures, what function a period, question mark or quotation mark plays in the discourse, the use of capitals and small case letters, etc. Clay contends that these concepts are of prime importance if the child is to be a successful reader. At no point in the test is the subject asked the purpose for his reading. However the global consideration is not omitted in the present study as several questions are positioned throughout the interview which seek to determine the purposes for reading.

Purpose for Reading

In 1961, Edwards designed a Reading Concept Test to be used with grade five children. The researcher's concern was to assess why reading was important, what the qualities of a good reader were, and whether the subjects were more inclined to read in order to please themselves or the teacher. Responses from the forced choice technique (between two answers) and multiple choice format (among 20 answers) were coded as either functional...getting meaning from the print, or as a tool for enjoyment or relaxation, and form...correct pronunciation, reading orally, being in a particular reading group, etc. One point was given for each functional response, with zero being coded for a form response. No significant relationship was found among any of the variables and the Stanford Achievement Reading Test, California Reading Test and the Lorge Thorndike Group Intelligence Test respectively. The present study also sought to discover the subjects' perceptions of the purposes of reading. Questions pertaining to the qualities of a good reader were included as well (What do you have to learn to be a good reader? How can you become a better reader than you are now?). The idea of importance was abstracted from answers to the question "Do you think reading is important? Why?" The responses were each given equal weight regardless of classifications, no one response being considered more meritorious than any other. Zero was given for a non-response. In Edward's (1961) study, only responses which were considered "correct" or meaningful were calculated. Such a method of scoring would not appear to be justified as subjects were penalized when they reported decoding as central to reading, a possible natural outcome from their years of instruction at school, and would not appear to give a complete picture of the child's purpose for reading.

McLaughlin (1978) interviewed 60 grade one children by means of a 67 question survey designed to ascertain their concepts for the purposes of reading in relation to the methods of instruction in the classroom. Results indicated that although most children could verbalize some purpose for reading, few of the responses related to obtaining meaning from the text. Most replies reflected the immediate needs of the child: knowing words, adult approval, or learning to read. Twenty-seven percent of the children understood that one reads in school in order to learn how to read; 20% reported that one reads at home for enjoyment; 28% were of the opinion that other people read for enjoyment or to learn something. McLaughlin reported that a minimum of 25% of the subjects were "unable to demonstrate a sound understanding for the purpose of reading" (p. 114). The present study replicated in part the research just mentioned. Questions pertaining to success or failure in reading (Why do some children not learn to read? Are all adults good readers?) were included in the hopes of gaining a more comprehensive understanding of how young children regard reading.

Concepts of Reading of Good and Poor Readers

Research indicates that there are differences in concepts of what reading is between good and poor readers. In her detailed review of several studies comparing the comprehension processes of good and poor readers, Golinkoff (1975) drew some strong conclusions. Poor readers appear to read text in a word by word manner with a minimum of text organization (the ability to read text in larger units than the single word). She states "inadequate reading comprehension seems to imply being somewhat of a slave to the actual printed word" (p. 654). Quoting Gromer, Golinkoff contended that there may be several types of poor comprehenders--those that have decoding skills deficits and those who have deficits in text organization skills. Lack of insight into the reading process may account for the latter. Spiro (1977) is of the opinion that poor comprehenders tend to over-rely on processes in one direction, either text based or knowledge based, to the detriment of the other. In reporting the findings of Golinkoff and Resinksi, Golinkoff (1975) reported that poor readers appear to have no difficulty in obtaining the meanings of single printed words. She suggested that the difficulty may lie in longer decoding times which interfere with gaining the correct meaning when the word is not in isolation. While word analysis strategies are useful for reading, Smith (1975) contends that they are less necessary and can be short circuited during fluent reading by means of predictive and hypothesis-forming mechanisms.

In analysing a study conducted by Weber in 1970 Golinkoff (1975) reported that in oral reading, grade one good readers corrected twice as many errors that distorted sentence meaning as did poor readers. She suggested that the explanation could be that perhaps poor readers lack efficient strategies for finding errors that distort meaning and that "poor readers may less frequently detect when the meaning of a sentence has become anomalous because they are not comprehending to start with" (p. 636).

The findings reported by Golinkoff are confirmed in the study done by Goodman (1967) concerning the reading behavior of six beginning readers. Good readers were able to make sound/symbol associations and produced a greater percentage of miscues which were syntactically and semantically acceptable.

The present study dealt with the concepts of reading held by good and poor comprehenders. Questions, focusing on their own perceptions of themselves as readers, (How good a reader are you? Why do you think so?) were inserted to ascertain whether poor readers appear to be predominantly contextually constrained or experiential in their approach to reading. Another question (Is reading a hard thing for you to do? Why?) was included to provide information on the cognitive styles or idiosyncratic patterns of either group.

Glass and Burton (1973) investigated what successful decoders actually utilized when they decoded and what they said they did to help them decode correctly. Fifteen students from grades two and five 'read' a list of words they had not seen before, responses from which were taped and observations made during the sessions of what the subjects actually did. The results indicated that none of the students used anything other than a letter-clustering approach; no form of rules or principles were employed, although many students said they used the skills mentioned in word analysis programs. The researchers concluded that students who are successful decoders apparently do not use what is taught in the classroom. For the present study, the questions "What things does a person have to do to be a good reader?" and "What things does a person have to learn to be a good reader?" sought to evaluate what skills, decoding or otherwise, were necessary in the opinions of the subjects, to become successful readers.

In the study conducted by Canney and Winograd (1979) three good readers and three poor readers in each of grades two, four, six and eight, were identified by teacher judgement and test scores. Students were interviewed individually by means of a questionnaire (Phase I) responses from which was taped. Responses were coded as being object, decoding or meaning focused. Results indicated that higher comprehenders were more aware of the meaning focus features of reading as identified by their responses to the question "What is reading?". This awareness increased over the grade levels, more for good readers than poor readers. Lower comprehenders, in any grade, attended more frequently to the mechanical-decoding aspects of reading. The present research was a replication of the above study, in part; that is, the child sample followed the same procedures as those of Canney and Winograd study.

Summary

In the review of the research presented, several common elements are to be found:

1. Young children do not appear to realize that reading is a communicative process. Even after a minimum of eight months in school, and for many others, several years, a good proportion of students have not acquired the understanding that an effort to make sense of the text is essential in reading.
2. Young children's concepts of reading focus primarily on reading materials, being read to, and fast fluent expression.
3. Many children do not have a well-founded reason for learning to read.

4. Use and understanding of the technical and abstract reading terminology increase with age across the grades.
5. There are significant differences in the concepts of reading held by good and poor readers.

III. PARENTS AND READING

There appears to be limited data available on parents' concepts of reading. However some tangential studies provide information in the area. Sharon (1973) investigated the reading habits of American adults. A longitudinal study was conducted by Durkin (1966) to ascertain what teaching practices, if any, were employed by parents in relation to the reading development of their children. Guinach and Jester (1972), Koppenhauer (1974) and Flood (1977) considered the story-book reading situation as a prediction of reading success. Ryan (1974) investigated family reading patterns. These studies are reviewed below.

Sharon (1973) in a survey of the reading habits of a national sample of 5,067 adults, discovered that a substantial portion of the day was spent in reading. The survey was conducted in order to determine what was being read, by whom, for how long, for what reasons and to discover how reading fit into people's daily lives. The results indicated reading occurred primarily during the day's activities, such as work, shopping, and recreation. Most reading time was spent on newspapers, magazines, books and job related materials. The average adult read for almost two hours a day. However variability in reading time was discovered to be great. Almost 6% spent eight hours a day in reading, which as the author infers, may have involved a lot of reading at work. On the other hand, slightly more than 6% read for less than five minutes. The 5% of all adults who could not read depended on others to read for them and had an extremely low socio-economic status. Apart from this 5%, only 1% reported difficulty with any type of material they read. The researcher offers two explanations for this finding which he quotes as being in contradiction to the Harris survey of 1970. Either those who found it hard to understand a given material simply had not read it or the subjects were reluctant to admit to difficulty in reading. The Harris review provided evidence that a large number of the American population could not read adequately to fill out application forms for social security, bank loans, or driver's licenses. Of the 33% who read books in the Sharon (1973) survey, only 15 minutes per day were spent on the reading of children's books; that is, the least amount of 'book reading' time was spent in reading to children. Although 54% reported reading as a recreational activity, the median length of time was only seven minutes. The most prevalent reasons for reading were the desire to obtain information or to have something to do. As reporting of pleasure or enjoyment was not recorded, it is assumed that either no such responses were elicited or that such a small percentage was recorded as to be insignificant. That adults consider reading to be important appears evident. What effect this importance has for the development of reading concepts in children is less evident. The present study, though in no way as detailed as the Sharon study, sought to determine what adults read, how much time they spent in reading and their perceptions of themselves as readers.

Perhaps the most significant study of the relationship between home and parent involvement and reading was the research carried out by Durkin (1966). In her longitudinal studies of children who were early readers, interviews were conducted with the parents of both early and non-early readers. A number of the traits and characteristics of the children were recorded. Significant factors were not socio-economic levels, parent occupation or the children's intelligence. Rather, the attitude of the parents, the influence of older children and the interaction between parent and child were the variables recorded. The results indicated that more mothers of early readers said they read more frequently than the average adult; the early readers were continually read to at home prior to school entrance by one or both parents and/or older siblings; materials and books were most available which provided rich and exciting experiences for the child. This confirms Holdaway's (1979) premise that "children with a background of book experiences since infancy develop a complex range of attitudes, concepts and skills predisposing them to literacy. They are likely to continue into literacy on entering school with a minimum of discontinuity" (p. 49).

However the results from Durkin's study provide evidence that the parents were often confused as to what they should or should not do in relationship to their children's reading development. More mothers of non-early readers believed that reading should only be taught by a trained person, that pre-school help would only lead to confusion when the children started school. The conversation with one mother whose son memorized easily was reported by Durkin as follows:

> This tendency to memorize was referred to again and again when the mother told how she used to read to Steve, but stopped when

> he was about four. At that age, she explained, "He started to memorize all the stories". Asked why she was concerned about the memorization, the mother stated very emphatically that she "didn't want him to memorize words". "I wanted them sounded out" (p. 127).

Parents of early readers also expressed concern that early reading would lessen their child's interest in school. Durkin was of the opinion that the results of her study indicated parents were often confused and concerned about their child's pre-school reading. Although the present study was not designed to ascertain parents' views of their own child's development, the questions were sufficiently open-ended to allow them to speak freely on the notions of reading which came to them.

The interaction between a parent and child is more complicated than just whether they read together or not. The quality of the relationship must be optimal for developing positive attitudes towards books and reading. Guinacn and Jester (1972) contend that a distinction be made between the quality and the quantity of the interaction. They suggest that there is little reason to believe that "a barrage of language in an unpleasant situation would be a positive influence on the child" (p. 171). If the child is forced to listen, or if the parent views the process as a bother, the interaction might be a negative rather than a positive influence in developing the child's attitude toward reading. This is often demonstrated in the homework situation of a school age child. In the study of Guinach and Jester (1972) the PARS (The Parent as Reader Scale) was used in order to determine the quality of the mother-child interaction in a book reading situation. The average age of the children was two years, 11 months. Ten categories of parent behaviors, which in turn were broken down into subcategories, were employed to measure the interaction; e.g. What kind of feedback does the parent give the child, 1) no opportunity for feedback; 2) no feedback to child though it was needed; 3) only negative feedback given; 4) some positive feedback given; 5) feedback with expression and/or repetition. Results demonstrated that there was a great deal of variability in the way parents shared a book with their children, ranging from very complete and thorough descriptions of the actions and noises found in the illustrations with animated reading of the words to a rather perfunctory series of questions or comments. Flood (1978) in his study which sought to measure parental style of reading in the story-book situation states "the book won't teach the child to read. Children need to be involved in the story from beginning to end; they need to interact with the reader--their parent, to extend ideas, to question their own understanding and to relate their own ideas to experience" (p. 867). When parents were asked in the present study whether they liked or disliked reading, responses might indicate whether the story-book situation was pleasurable or not.

Koppenhauer (1974) contends that the habits, attitudes, values and ways of thinking appear to be behaviors learned from the family and modified to some degree by outside influences. If this contention is valid, how parents view the reading process should relate to the concepts of reading held by their children. This is the main hypothesis of the present research. The study conducted by Koppenhauer (1974) investigated the nature of the interaction between parents and childnen and the relationship of that interaction to reading success. Thirty high and 30 low achievers at the fifth grade level comprised the sample. Home environment was defined as the climate for achievement motivation, the opportunities for verbal development, the nature and the amount of assistance provided in overcoming academic difficulty, the stimulation provided for intellectual growth and the provisions for general types of learning in a variety of situations. Results indicated that there was a positive correlation between home environment and reading success in school.

In a study designed to ascertain family reading patterns, Ryan (1974) administered a 45 item questionnaire to 109 university freshmen with the request that as many members of the extended family as possible participate. There were two groups of students. Group A comprised 54 students in a regular college composition course, Group B with 55 students involved in smaller more intensive composition and reading classes. The mean reading score for Group A was 14.0 while a 9.5 score was the mean for Group B. Results of the study indicated that the parents of Group A read to their children significantly more often when they were young than did the parents of Group B. Perhaps more interesting was the finding that the mothers and fathers of Group A began to read for pleasure themselves at significantly earlier ages than did the parents of Group B.

The above research is fairly conclusive. The reading adult (parent) appears to play an important role in the development of his child's reading achievement.

IV. THE RATIONALE FOR THE STUDY

Over the years, suggestions have been made to parents that they should read to their children. Reasons for the request have been primarily to foster an interest in books and a growth towards literacy. Flood (1977) stipulates that parents should not be led to believe that verbal interaction during the reading episode will automatically produce successful readers. In certain cases, the ability of some parents to read dynamically with their children is quite natural; for others it may be a strained performance. The attitude the parent himself/herself has toward reading has been virtually ignored in the literature. It has been taken for granted that all parents like to read to their children. This may well be in the majority of situations. But what of the parent who dislikes reading? His/her style of story-book reading may restrict or prevent the development of appropriate reading schemata in the child; he/she may not invite his/her child to participate or allow enough time during the reading for the child to verbalize about what is happening in the story. As the research has shown, children need time to develop reading concepts. Smith (1971) contends that through the imitation of parents' behaviors, the child becomes aware of behaviors necessary for success in reading: how to hold a book, that one reads the print and not the pictures, the importance of picture cues, the recall and enjoyment of reading and language facility to understand and appreciate the story. Stauffer (1970) has emphasized that reading is "a dynamic active process" (p. 125). Smith (1971) concurs when he stipulates that reading is not a passive activity--the reader must make an active contribution if he is to acquire the available information. However if the reading situation at home is not dynamic, and the little listener is only a passive recipient of words, how will that same child develop some understanding of reading, how will appropriate concepts of reading be nurtured?

This researcher contends that how parents view reading, the importance they place upon it, what their self-perceptions as readers are, what their concepts of reading entail, etc., may be the key to the success or non-success for their children's reading. If the parent is of the opinion that reading is something he/she engages in when there is nothing else to do, that life is too busy to allow for leisure reading time, that the only reason for reading is for information and never pleasure or relaxation, that for the child, reading is something to be done at school and rarely at home, then that parent may well be fostering similar schemata for reading in his/her child, in spite of having dutifully read bed-time stories. As research in parents' concepts of reading, per se, is limited and research on parents' reading schemata as they relate to the reading schemata of their children (who may be good or poor readers) is practically non-existant, the key purpose of this study was to generate data to throw some light on this issue. The design which guided this study is outlined in the next chapter.

CHAPTER III

THE DESIGN OF THE STUDY

In this chapter the design of the study, the sample, the instruments, procedures, analysis of data and the statistical analysis are described.

THE DESIGN

The major purpose of the study was to investigate the relationship between parents' concepts of reading and that of their grade one children. To achieve this goal, two questionnaires, one for parents, another for the children, were utilized to collect the data. Responses to the questions were coded and tabulated. Descriptive statistics were used for all questions except the final one--what is reading? Analyses of variance were the statistical tools employed to analyse the data obtained from that particular question. The four sets of factors were parents - children; parents of good readers - good readers; parents of poor readers - poor readers; and good readers - poor readers. The dependent variable was the nature of the reading concept held, which could be object focused, decoding focused or meaning (comprehension) focused.

SAMPLE SELECTION

The sample for this study consisted of 20 grade one children and 20 parents. Each parent subject corresponded to a child subject. The children attended school in a large suburban middle class area of the Edmonton region. The school district was comprised of five elementary schools, K-8, and one high school. Each of the eight grade one classes in the system (N=8) was self-contained. All of the teachers of the children in these grade one classes were considered experienced, that is, each had had at least five years of teaching experience. The grade one population in the system totalled 186 students. An equal number of children from each of the five schools was chosen rather than selecting all the subjects from one school. It was thought that more varied instructional methods might provide for wider definitions of 'what reading is' if all schools were included.

After permission had been granted to conduct research in the schools, the eight grade one teachers in the system were contacted. The project was explained to them with requests being made to supply the names of eight children in each school. The following criteria for the selection were used:

1. English was to be the mother tongue of each child.
2. The children were to be residents of the class for the past six months.
3. None of the children was to be a repeater in grade one.
4. Four of the children were to be the highest achievers and four to be the lowest achievers, in the teachers' judgments, in the school.

Although sex was not considered as a variable in the study it is interesting to note that three of the parents were male. For the group comprised of good readers, there were four boys and six girls. The researcher administered the Metropolitan Achievement Test, Primary I, Form F (1970) to the eight children in each school. The two top achievers and the two lowest achievers in each school were selected to participate on the basis of the results of this test. Four children were thus identified from each of the five schools and constituted the child sample.

Although each child came from a two parent family, the researcher stipulated that only one parent of each child participate. The parent most involved with the child's school work became the determining factor. Based upon the request, twenty parents constituted the adult sample.

INSTRUMENTS

The Metropolitan Achievement Test (Reading) Primary I, Form F (1970 Edition).

The Metropolitan Achievement Test (Reading) Primary I, Form F, was employed to obtain a standardized reading achievement rating for each child in the study. Sabers, in Buros (1978) in his review of the test maintains that it is as good as any and better than most standardized reading tests. He further contends that it serves as a rough measure of reading achievement for comparative purposes (p. 734). As the intent of this study was to identify two groups of children of widely dispersed reading levels in order to compare their concepts of reading in relationship to that of their parents, this particular test appeared most suitable.

The test was administered by the researcher during the morning school session at each individual school. The subjects wrote Subtest I, Word Knowledge and Subtest III, Reading, in groups of eight in a room apart from their regular classroom. Directions as set out in the manual were adhered to. The subtests were added to give a total reading score, also as per directions in the manual. Percentile ranks and stanine scores were recorded. When two children in one school obtained the same percentile rank, the raw score became the measure by which a child would be selected, the higher raw score being chosen for the good readers, the lower score for the poor readers.

Questionnaires

Two separate questionnaires, one for children and one for parents, (See Appendix A) were used in the study. Except for the deletion of question #5 both are very similar to that developed by Canney and Winograd (1979) which was designed to ascertain students' knowledge of the purposes and nature of reading. Resembling one another in content, some of the questions, e.g. 4, 6, 12, 13 and 15 are phrased differently in each specimen. The phrasing in the parent example is that suggested by Canney and Winograd (1979) for older children, i.e. grade eight students. In lieu of the word 'person' in the children's survey, the more colloquial 'kid' was inserted.

Designed to be administered by personal interview, the questionnaires followed an open-ended format. This allowed the interviewer the freedom to probe or rephrase questions if further information was necessary or if misunderstanding was perceived on the part of the subject. Reid's research (1966) suggests this form of questioning to be most suitable. Acceptable probes such as "Is there anything else?" or "Can you tell me more about it?" were offered to expand the subject's responses. Three probes were considered maximum for any one question. The key question, #15, "What is reading?" is positioned last to allow the participants to warm up to the subject of reading and thus minimize the likelihood of an "I don't know" response which other researchers recorded for 69% of their subjects (Johns and Ellis, 1979).

PROCEDURE

The procedure in this study followed four steps:

1. The pilot study of the parent questionnaire was conducted.
2. The Metropolitan Achievement Test was administered.
3. Interview conditions with children and parents were planned and interviews conducted.
4. Data for the study were analysed.

Pilot Study of Parent Questionnaire

Prior to the main study, a pilot study was conducted to determine if the questions would elicit appropriate responses from adults. The questionnaire had previously only been used with children, the oldest of whom attended grade eight. Four parents of grade one children were selected by the researcher. None of them had children attending the chosen school division. Each parent was interviewed at the researcher's home with conversations being tape recorded. They were later transcribed verbatim at which point the data were coded and analysed. Results of the pilot study indicated that the subjects responded to the questions with little difficulty. They provided a wide variety of answers once they had been assured initially that the researcher was more interested in their opinions rather than "correct answers". However question 5--"To read, do you have to have a book?" allowed for some confusion. A decision to delete it was taken as the information provided therein was not vital to the study. Question 6 was reworded to include 'others' in place of 'parents' and 'in your environment' was appended. 'Adult' was inserted in #12 in lieu of 'grown up'. 'Adult' also replaced a particular grade level in question 13.

The revisions to the last three questions were initiated prior to the pilot study in order that parents might feel that the questionnaire approached their conversational level more accurately. No other changes to the original example developed by Canney and Winograd were made.

Metropolitan Achievement Test, Primary I, Form F (1970)

As already mentioned, the test was administered and marked by the researcher during the morning school session at each individual school. Testing took place during the last week of April and the first week of May. Group administered in a room apart from the classroom, care was taken to ensure that the subjects were not deprived of one of the 'fun' activities for the day in order to write the test. The subjects questioned and talked with the researcher prior to testing which allowed them to feel at ease. The children did not appear anxious. Even when they came to a difficult passage, they continued their work when so encouraged. The guidelines for testing as set out in the manual were followed. Upon completion, scores were tabulated and the teachers of the subjects were alerted as to which children had been chosen to participate.

Interviews

A letter was sent to the parents of the twenty chosen children (See Appendix B) requesting their participation in the study. All the parents of the child sample agreed to be interviewed when telephoned by the interviewer, after they had been assured that anonymity would be maintained. The parents of each child chose between themselves as to which one would be involved in the conference. A request had been made that the parent who was most involved in the child's school work participate. The researcher had no way of knowing if, in reality, the "correct" parent was interviewed or whether it was a matter of convenience that one parent rather than the other contributed to the study. It is assumed that the parents honoured the request. Times convenient to both parents and researcher were scheduled, mostly in the evening after the bedtime hour of the child subject. In only one case was the child present; she had been interviewed previously at school.

All but four of the parents were interviewed at their homes; three subjects came to the researcher's home at their request; one chose her place of employment. Parents made a special effort to have other siblings either in bed or occupied elsewhere while the interviews were conducted. In all cases, only the parent who had chosen to participate in the study was present. Few interruptions took place in the majority of interviews. Parents were put at ease when told that it was their opinions rather than "correct answers" that were being sought, by informal chatting prior to the interview and by the guarantee of anonymity. Only one appeared nervous during the session. Interviews lasted from 25 to 45 minutes. Due to scheduling difficulties, it was not always possible to speak with the child prior to his parent, but every effort was made to do so. In the cases where the adult contributed first, she was asked not to discuss the questions with her child. The researcher is of the opinion that the request was honoured as the children who were interviewed after their parents answered "No" to the question "Did your mother tell you what she and I had been talking about the other day?" Preceeding each session, questions consisting of general information gathering, e.g. hobbies, other members of the family, early reading experiences, were introduced to allow for a relaxed atmosphere and to alleviate any pressure the subjects may have felt.

The child subjects were all interviewed at their respective schools in the morning and early afternoon; the location was a private room. The children were escorted, one at a time by the researcher from their classrooms to the taping room. They were allowed to play with the tape recorder prior to the session and listen to a play back of the general conversation which preceeded the interview. In short, the test atmosphere was relaxed and the subjects did not appear to be pressured. Each subject was told "I am going to ask you some questions, now, and I'm sure you'll have fun answering them. If you don't understand what I say, just tell me and I'll explain". Sessions lasted approximately 15 - 20 minutes. Some children asked that the whole interview be played back; this was done at their request. As the researcher presented the questions, an effort was made to probe more deeply, or to rephrase them if the child seemed unsure or reluctant to respond. There were few "I don't know" responses. If a child nodded or shook his head in reply, the interviewer said "Pardon?" whereupon the child verbalized an answer.

All subjects in the study received the questions in the same order. Occasionally a response to a later question provided further information for a previous question. In such instances, the interviewer later rephrased the earlier question to elicit further information and in transcription, coded the data in what appeared to be the appropriate place.

As discussed earlier, both parents and children were given no more than three probes per question. If after the first probe no further information was forthcoming, the interviewer moved to the next point. When a response was vague, a probe such as "Could you explain that?" was employed to help pursue the subject's thinking and/or clarify the response. Most subjects appeared to enjoy the sessions and tried to clarify their answers upon request.

The researcher carried out all interviews which were tape recorded and later transcribed verbatim for analysis (See Appendix C for two sample interview protocols).

DATA ANALYSIS

Two separate steps were involved in analysing the data:

1. The categorization of responses for questions 1-14.
2. The classification of responses to question 15, utilizing the t-unit, to determine whether responses were object, decoding or meaning focused.

1. Questions 1-14

After all responses to the questions and probes had been taped, a verbatim transcription was carried out by the researcher which in turn was rechecked with the tapes for accuracy. Most questions were of the yes/no format; however the probes provided reasons for particular responses. Through the examination of individual replies to the probes, it was discovered that various patterns or categories of responses had emerged. To allow the information received to be more meaningfully coded, the questions were regrouped into semantically similar categories when it became evident that the patterns of responses provided information to more than one question. Nine categories replaced the original 14 questions. The categories and the patterns which emerged as responses are as follows. Question numbers are in parentheses.

CATEGORY	REASONS
1. Like - Dislike (1, 2, 3)	
* yes no yes/no don't know	* enjoyment * communication * teacher says * know words difficulty time constraints outside pressures wait turn
2. Reading Competence (4)	
excellent above average average below average poor (low)	

CATEGORY	REASONS
3. Reading Outside School (5) yes no don't know	enjoyment communication nothing else to do
4. Reading Frequency at Home (6) daily twice a week less than twice a week	
5. Importance of Reading (7) yes no maybe	communication enjoyment for children adult says to give help good for you important books
6. How to Improve as a Reader (8, 9, 14) decoding skills comprehension skills better teaching more personal involvement listen better practice speed more time allotted pay attention	
7. Age of Competency (10) 4 years old or less 5 - 9 years 10 years +	sibling model general maturity more knowledge can already read
8. Some not learn to Read (11, 13) yes no don't know	decoding communication teacher school home practice

CATEGORY	REASONS
8. Some not learn to Read (11, 13) (continued)	
	age lack of interest other: I.Q., personality, etc.
9. Adult-child Reading Processes (12)	
yes no yes/no maybe	decoding comprehension maturity intelligence more knowledge can already read different materials enjoyment both reading

The responses from each member of the four groups--good readers, poor readers, parents of good readers and parents of poor readers were classified according to the above mentioned categories. Each response was nominally classified. No response was hierarchically or otherwise assigned any value. The semantic content of the responses provided the basis on which they were judged. Frequencies of responses to each question and the reasons thereof were calculated for each group, for the combined group of parents and for the combined group of children. Percentages for the above groups were then calculated. Frequencies and percentages were hand calculated. An independent judge, a university professor with many years' experience in reading research, analysed the responses of two parents and two children, in order to assure the reliability of the response categories by the researcher. There was 100% agreement between the rater and researcher.

2. Question 15

The responses to this question were first divided into t-units. Directions for the divisions, suggested by Fagan (1978) were followed. Four responses, two parents and two children, were analysed by another rater, a graduate student in reading, to establish the reliability of the number of t-units per response. There was perfect agreement between this rater and the researcher. Next the responses (t-units) were grouped into one of three categories, a) object focus, b) decoding focus and c) meaning focus. The twenty-two features of reading identified by Canney and Winograd (1979) were discovered in the responses of the subjects in the present study. The focus categories and their exemplars are as follows:

Object Focus

* reading a book
* listening to instructions by a teacher

Decoding Focus

* learning the alphabet/learning vowels and consonants
* sounding out words
* saying words
* looking at words
* recognizing words
* learning words
* memorizing words
* blending words to form compound words
* spelling words
* writing words
* punctuating sentences

Meaning Focus

* learning word meanings
* understanding word meanings
* putting words together to make sentences/stories/poems
* understanding sentences/stories
* remembering what is read
* interpreting signs and symbols

- * thinking about what is read
- * learning about people and the world
- * a form/means of communication
- * pleasure, enjoyment, relaxation (inserted by researcher)

(Canney and Winograde, 1979)

In certain cases, it was not possible to make an absolute decision to place a t-unit (response) in only one focus, e.g. "you look at the words to understand them." Such examples, and there were only a few, were coded as belonging to two focuses, that is, a score for the above example was given for decoding and meaning. Inter-rater reliability for the same graduate student and the researcher, attained 91% agreement for the coding of the t-units into the three focuses. The following example demonstrates how one parent's responses to question 15 were divided into t-units and coded.

(object) (meaning)
----Reading is reading books / like...reading up on things. / And

(decoding) (meaning)
you look at the words in the sentences / and you understand it. /

(meaning)
It's like finding out in a way when you can't be there. /

object focus 1

decoding focus 1

meaning focus 3

Each t-unit was nominally scored; no t-unit was hierarchically or otherwise assigned any value. The number of object focus, decoding focus and meaning focus t-units were recorded for each subject in the study.

STATISTICAL ANALYSIS

The data for each subject were key punched onto IBM cards upon scoring completion. Each subject was given an identification number, a designation as to whether he was a good or poor reader or the parent of a good or poor reader; three scores, one each for object focus, decoding focus or meaning focus where applicable were recoded on the data sheet. Reading percentile scores were also noted for the child sample. Statistical treatment of the data involved two two-way analyses of variance with repeated measures and one three-way analysis of variance with repeated measures. The first two hypotheses were tested by utilizing a two-way analysis of variance for calculating significant differences between the means. The three-way analysis of variance with repeated measures across different categories of concepts of reading was employed to test the significance of the third hypothesis.

SUMMARY

This chapter has discussed the design of the study, the sample selection, the instruments used, the procedures followed, the analysis of the data and the statistical analyses employed.

Chapter IV presents the statistical findings and results of the study together with a discussion of these results.

CHAPTER IV

STATISTICAL DATA

This chapter presents each of the three hypotheses which were subjected to statistical analyses. They are concerned only with the responses to question 15 "What is reading?" Responses were divided into t-units. Raw scores and percentages of raw scores for the object, decoding and meaning foci were tabulated and subjected to analysis of variance procedures. As no significant differences emerged for either method, the data presented below are based on raw score figures. Each hypothesis is restated from Chapter I. A statement of rejection or non-rejection is given followed by a table containing the data concerning the significance of the relationships explored. Immediately following result presentation, each hypothesis is discussed. The chapter concludes with a summary.

HYPOTHESIS 1

There will be no interactions effects for the concepts of reading held by grade one children and their parents.

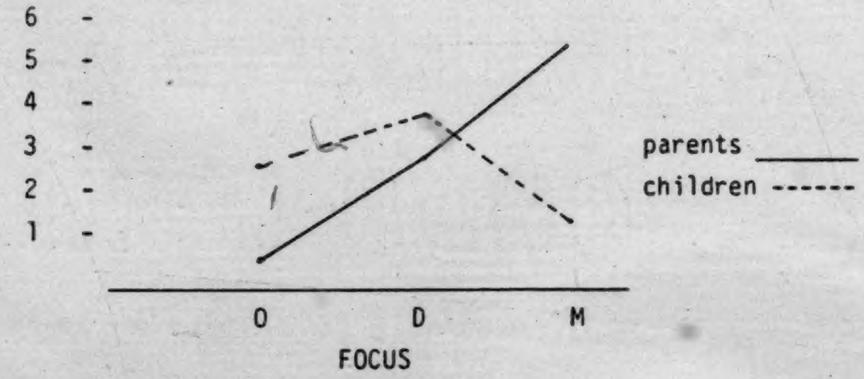
This hypothesis was rejected (Table 1). Whereas there were no differences in the overall concept of reading, there were differences within the focuses of the concept (Figure 1).

Table 1

Analysis of Variance for Differences Between Parents and Children for Concepts of Reading

Source of Variance	SS	df	MS	F
Between Subjects	126.80	39		
A (parents-children)	3.33	1	3.33	1.02
Subjects within groups	123.47	38	3.25	
Within Subjects	620.66	80		
B (concepts)	80.61	2	40.31	9.22*
AB	207.72	2	103.86	23.75*
B x subjects within groups	332.33	76	4.37	

*Probability of F = 0.002



Cell means

	Object	Decoding	Meaning
parents	0.55	2.80	5.35
children	2.60	3.75	1.35

Figure 1
Parents' and Children's Concepts of Reading

Discussion

The differences between parents and children for concepts of reading were analysed by a two way analysis of variance with repeated measures. The results indicated that while parents focused primiarly on a meaning concept (mean 5.35), the dominant feature for the child subjects was that of decoding (mean 3.75). It is this researcher's opinion that a decoding focus may be the result of the children's reading experiences in school where traditionally more emphasis has been placed upon the mechanics of reading than interpretation of the text. Such an explanation appears to agree with Chall's (1967) view when she contends that the majority of primary grade teachers consider decoding as the major focus of early reading instruction.

In order to determine more exactly where significant differences existed among the three concept for children and parents, a Newman-Keuls Comparison of Ordered Means was conducted. The differences between subjects is demonstrated in Table 2.

Table 2

Significant Differences Between Parents
and Children for Concepts of Reading

OBJECT			DECODING			MEANING		
NK	r crit	p	NK	r crit	p	NK	r crit	p
2.05	1.53	.01	.90	1.53	NS	4.00	1.53	.01

Significant differences between both groups were found for the object and meaning focuses of reading. The children concentrated more frequently than parents on a definition of reading as being something over which they did not have control, as being the responsibility of someone else other than themselves. These interpretations agree with the literature (Denny and Weintraub, 1965; John, 1972). For parents, on the other hand, reading was not considered as something done to them; they perceived it primarily within a comprehension or an understanding-of-the-text context. This finding is to be expected. Overwhelmingly, studies (Clay, 1972; Downing, 1979; Edwards, 1965) have found that as children mature in age, a deeper understanding of the reading process is obtained; that is, as they grow older, they become more aware that reading entails top-down processing behaviours. As one of the groups under discussion was comprised of adults, it is not surprising that they placed considerable emphasis on meaning-focused definitions of the task.

Perhaps it should be noted that although all parents and just over 50% of the children provided responses which were recorded in the meaning category, the children's responses were primarily on understanding word meanings and putting words together to make sentences and stories. Parents referred more frequently to the interpretative features of meaning--how thinking is required for reading and that reading is the medium through which one can learn about the world. Although both types of definitions were classifed as belonging to the meaning category, this researcher contends that the adults provided responses at a higher level of understanding of what reading is than did their children. In other words, it appeared that parents viewed reading as a process which involves reading between and beyond the lines. The children, on the other hand, who referred to meaning, were more orientated to the literal context of the text.

A point of note was that the analysis indicated that the differences between parents and children were non-significant for a decoding focus. None of the children failed to refer to this feature of reading; all but three of the parents also thought it sufficiently important to mention. One interpretation could be that the parents were particularily aware of decoding because their young children, in bringing home their school work, focused on that feature of the reading process, thereby possibly influencing the concepts held by their parents. It is also possible that parents, like many primary teachers, viewed the decoding process to be a significant component in learning to read. One may assume that it might be easier for parents to assist their offspring with decoding since the skills have been precisely defined than to encourage them in the expansion of their ideas and interpretation of the text.

In summary, parents and children differ significantly in their concepts of reading for the object-related features and the meaning-related components. Parents tend to define reading as extracting information from the text because of the ability to identify letters, words and meanings. Children, on the other hand, tend to perceive reading as something under the control of others and which emphasizes the pronounciation of words. The concept that reading involves understanding appears to be absent in the scehmata for reading for the majority of children.

HYPOTHESIS 2

There will be no interaction effects for the concepts of reading held by good readers and poor readers in grade one.

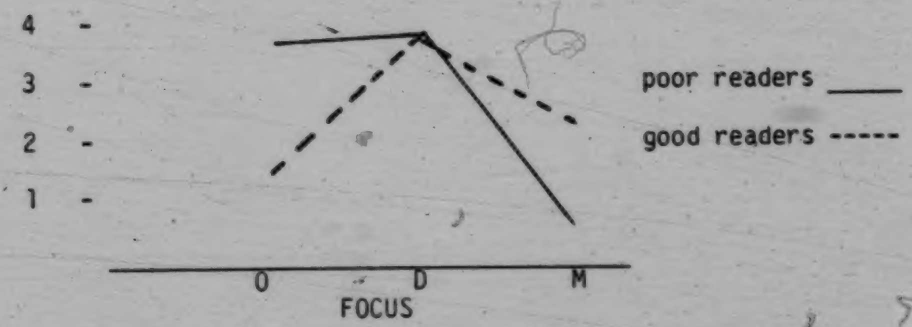
This hypothesis was rejected (Table 3). Whereas there were no differences in the overall concept of reading, there were differences within the focuses of the concept (Figure 2).

Table 3

Analysis of Variance for Differences Between Good and Poor Readers for Concepts of Reading

Source of Variance	SS	df	MS	F
Between Subjects	44.07	19		
A (good-poor readers)	0.07	1	0.07	0.027
Subjects within groups	44.00	18	2.44	
Within Subjects	210.67	40		
B (concepts)	57.63	2	28.82	9.71*
AB	46.23	2	23.12	7.79*
B x subjects within groups	106.80	36	2.79	

*Probability of F = 0.001



Cell means

	Object	Decoding	Meaning
poor readers	3.70	3.80	0.30
good readers	1.50	3.70	2.40

Figure 2

Good and Poor Readers' Concepts of Reading

Discussion

A two way analysis of variance with repeated measures was conducted in order to ascertain the differences in concepts of reading for good and poor readers. The results confirm the findings of many researchers (Johns, 1974; Golinkoff, 1974; Glass and Burton, 1973) that significant differences exist between high and low comprehenders in terms of the nature of their concepts of reading. In order to discover more exactly where the differences were to be found, a Newman-Keuls Comparison of Ordered Means was employed. Table 4 presents the results.

Table 4

Significant Differences Between Good and Poor Readers for Concepts of Reading

OBJECT			DECODING			MEANING		
NK	r crit	p	NK	r crit	p	NK	r crit	p
2.70	1.89	.01	.95	1.89	NS	2.1	1.89	.01

For the object-related focus, a $p < .01$ level of significance emerged between the two groups where the mean score of good readers was considerably lower than the mean score obtained by poor readers. The latter group appeared to be orientated to this feature of reading more frequently than their successful peers. In fact, all but one referred several times within their responses to reading as "reading a book", "listening to the teacher", etc. For the more able comprehenders, seven of the subjects perceived reading as being object-related; however, these responses occurred less frequently for each of the good readers than for each member of the poor reader group. Three of the high readers did not refer at all to this category. One may assume, therefore, that as a group, good readers had progressed beyond such a definition of reading, while poor readers were still object-bound in their interpretations of what reading is.

For the meaning focus, the mean scores were 2.40 and 0.30 respectively for good and poor readers. The differences between the two groups were significant at the $p < .01$ level for this particular focus. As previously stated, all good readers made reference and were orientated to meaning foci in their definitions. Such results do not agree with studies in the area (Downing, 1972; Johns, 1972) where good readers in this grade level did not possess a meaning concept of reading. These researchers reported that many able comprehenders failed to refer to extracting information from the text in their explanations of what reading is. It is the present writer's opinion that the warm-up questions and the selection of able readers at or above the 90th percentile on a standarized reading test influenced the above-reported results. It is possible that these children, because of their success with the reading task, were more conscious of the meaning aspects of the reading process. Their fluency helped them to the realization that comprehension is a necessary component in reading. In other words, their schemata for reading contained slots for meaning. Similar schemata did not appear for a meaning feature for poor readers, as only one child within this group, referred to meaning-getting in his/her responses to the question.

No significant difference was found between the two groups for the decoding focus. In essence, both groups attained mean scores which were highly similar, 3.70 as opposed to 3.80. The scores, for both, were higher than the means for each of the two other concepts of reading. As mentioned previously, such results may be an indication of the kind of instruction the children received in school where emphasis is placed on the mechanics of reading by their teachers. In this environment, learning how to read is seen in a different light to reading for meaning. As both groups appeared similar for their focus on decoding, one may assume that good readers use the decoding skills they have learned to gain information from the text in a meaningful way and may be organizing text both in a bottom-up and top-down manner. Poor readers, however, may be decoding text for decoding's sake without the realization that they are supposed to interpret units larger than the single word and therefore do not read for meaning. The poor comprehender, with a strong focus on the object and decoding features of the task and little or no orientation towards meaning-getting, may be processing text in a bottom-up fashion only, to the detriment of his/her understanding and enjoyment.

In summary, the results from this hypothesis indicate that significant differences do exist between the concepts of reading held by poor and good readers in their focus towards object and meaning features of what reading is. While both groups were highly concerned with decoding, the reasons for such emphasis may vary between the groups. Johns (1979) has queried whether good readers' concept about print caused them to be competent readers or whether their concepts about print were a result of their reading ability. This researcher is of the opinin that perhaps it is the interaction of the concepts about print and the reading ability which lead to comprehension. Such an explanation appears reasonable when the reading scores and the verbalized concepts of reading produced by the children, in this study, are examined together.

HYPOTHESIS 3

a) There will be no interaction effects for the concepts of reading held by grade one good readers and their parents.

b) There will be no interaction effects for the concepts of reading held by grade one poor readers and their parents.

These hypotheses were rejected (Table 5). Whereas there were no differences in the overall concept of reading, there were differences within the focuses of the concept (Figure 3).

Table 5

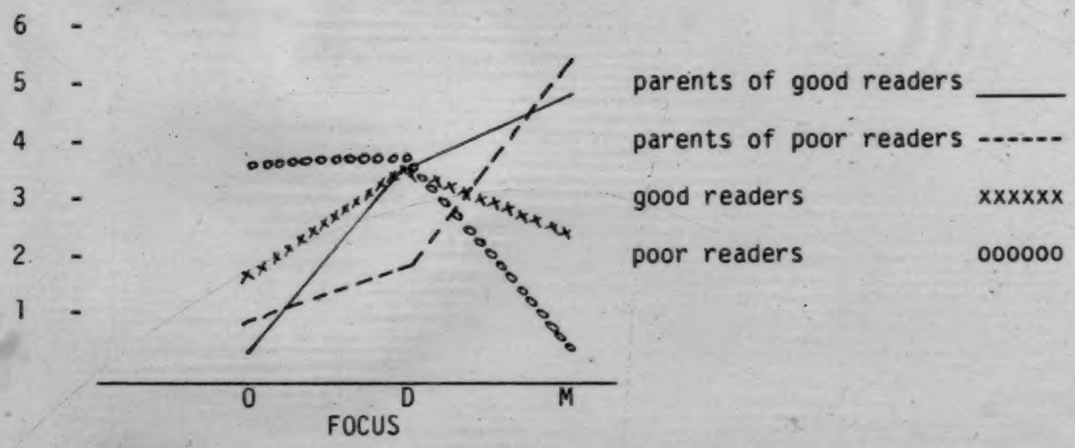
Analysis of Variance for Differences in Concepts of Reading Held by Grade One Good and Poor Readers and Their Parents

Source of Variance	SS	df	MS	F
Between Subjects	126.80	39		
A (parents, good-poor)	3.33	1	3.33	0.98
B (children, good-poor)	0.13	1	0.13	0.04
AB	0.53	1	0.53	0.16
Subjects within groups	122.80	36	3.41	
Within Subjects	620.66	80		
C (concepts)	80.62	2	40.31	10.88***
AC	207.71	2	103.86	28.03***
BC	30.22	2	15.11	4.08*
ABC	35.32	2	17.66	4.77**
C x subjects within groups	266.80	72	3.71	

*Probability of F = .05 ** = .01 *** = .001

Discussion

A three way analysis of variance with repeated measures was conducted in order to determine whether each group of parents and their children differed significantly in their concepts of reading. Figure 3 displays each group's concept of reading and their relationship to one another.



Cell means

	Object	Decoding	Meaning
parents of good readers	0.30	3.70	5.00
parents of poor readers	0.80	1.90	5.70
good readers	1.50	3.70	2.40
poor readers	3.70	3.80	0.30

Figure 3

Parents' and Their Children's Concepts of Reading

A Newman-Keuls Comparison of Ordered Means was conducted in order to ascertain where the significant differences among the four groups were to be found. Table 6 presents the results of the comparisons.

Poor readers differed significantly from their parents within the object-related focus. Such significance was not found for good readers and their parents within the same focus. For the object focus, therefore, it appears that poor readers differ significantly from all other groups by focusing more on reading in relation to outside factors than do the other groups.

Significant differences also occurred between the low comprehenders and their parents on the meaning emphasis of reading with a probability

Table 6

Significant Differences for Good and Poor Readers and Their Parents for Concepts of Reading

Group	Focus	NK	r crit	p
poor-good readers	Object	2.20	2.20	.01
poor readers-parents of poor readers	Object	3.40	2.70	.01
parents of good-readers parents of poor readers	Decoding	1.80	1.65	.05
poor-good readers	Meaning	2.10	1.65	.05
poor readers-parents of poor readers	Meaning	5.40	2.35	.01
poor readers-parents of poor readers	Meaning	4.70	2.72	.01
good readers-parents of good readers	Meaning	3.30	2.21	.01

of .01. Whereas the parents placed less emphasis on decoding than did their children, they placed greater emphasis on meaning. Only one child within this group referred to meaning, while all the parents of poor readers more frequently mentioned meaning than any other group. One interpretation of the results may be that as these parents focused primarily on comprehension while their children's concerns were with the mechanics of the task, assisting their offspring in reading might possibly prove to be frustrating for both groups as neither is aware of the other's emphasis. In other words, children may be bound by the very detailed word by word decoding while their parents are focusing on the meaning concept of the task.

Unlike the poor readers and their parents, differences within the schemata for reading for the object focus were not found between good readers and their parents. Significant differences did emerge between the two groups for the meaning focus. Although the types of responses as to their understanding of what meaning is in reading varied between the children and parents, all of the former produced some evidence of meaning-getting in their replies.

Although not a stated part of this hypothesis, one unexpected finding is that differences between means occurred between both parent groups for their degree of focus on reading as decoding, with the parents of poor readers focusing less on this feature. This finding is difficult to explain. It is not surprising that these parents*, like the parents of good readers placed more emphasis on reading as extracting meaning from the print. However, since they placed less emphasis on decoding is it not possible that as as they worked with their children, they stressed the meaning aspect of reading and minimized any focus on decoding which would have been in conflict with the children's notion of what reading is?

To summarize, parents of good readers and good readers were more similar in their concept of what reading is than were poor readers and their parents. In fact, poor comprehenders differed significantly in their concepts to those held by the three other groups, in all instances save for the decoding emphasis. The main focuses in their definitions stressed object-related and decoding features with only minimal reference to the extraction of meaning from print. It is possible that they have not yet formed appropriate schemata for reading because of their erroneous understanding that reading is a process under the control of others, and that sounding out words constitutes reading.

---

* It must be remembered that these parents were similar to the parents of the good readers in educational standards and class status.

Smith (1978) contends that children naturally seek meaning when they approach the reading task. If such is the case, and this researcher would not care to disagree, one questions why nearly 50% of the children in the present study did not produce evidence in their verbalizations that meaning was central to, or at least tangential to the reading task. Smith (1978) further stipulates that if children are not taught or do not discover that print is meaningful, they will find reading instruction non-sensical and therefore may not succeed in their efforts in learning to read. For the poor readers, in this study, it would appear that such is the case.

SUMMARY

Although significant differences were not found for the overall concept of reading between parents and children, significant differences within the focuses of the concept were discovered among the four groups.

Chapter V presents the descriptive findings and results thereof together with a discussion of those results.

CHAPTER V

THE FINDINGS OF THE STUDY

This chapter contains the descriptive results of the study and is presented in the following manner. Each question is restated from Chapter I. Frequencies of responses to each question and the ensuing probes were hand calculated for each of the four groups of subjects. Bar graphs indicate the percentage of semantically similar responses to each question and the reasons for the choices thereof. Discussion follows as to the similarities and differences between the groups. The chapter concludes with a summary.

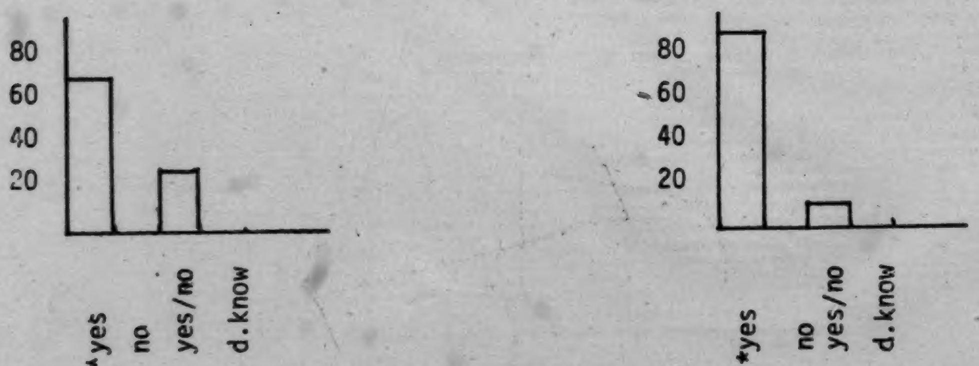
DESCRIPTIVE DATA

Question 1

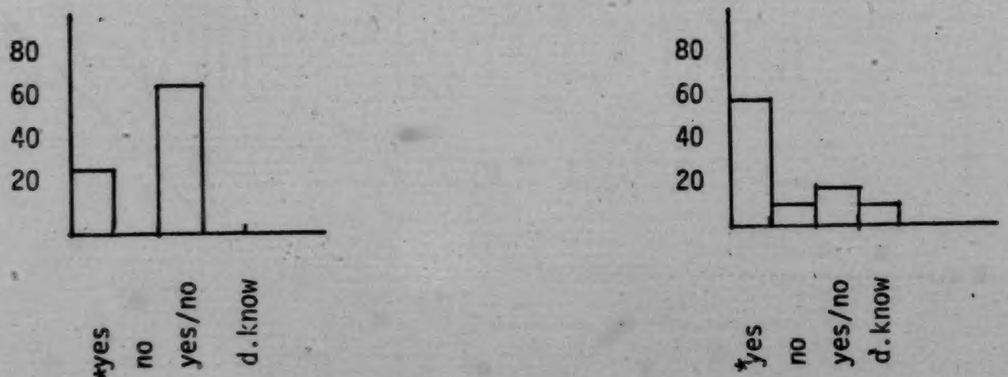
Do Parents and Children Like or Dislike Reading?

The first three items on the questionnaires provided data for this question -- 1) Are there some things you like about reading? 2) Are there some things you dislike about reading? and 3) Is reading a hard thing for you to do? Why? Figures 4 and 5 present the results derived from the responses.

Ninety percent of the poor readers claimed they liked reading. However when one analyses the graph displaying their responses, these


good readers

poor readers


parents of good readers

parents of poor readers

Figure 4

Do Parents and Children Like or Dislike Reading ?

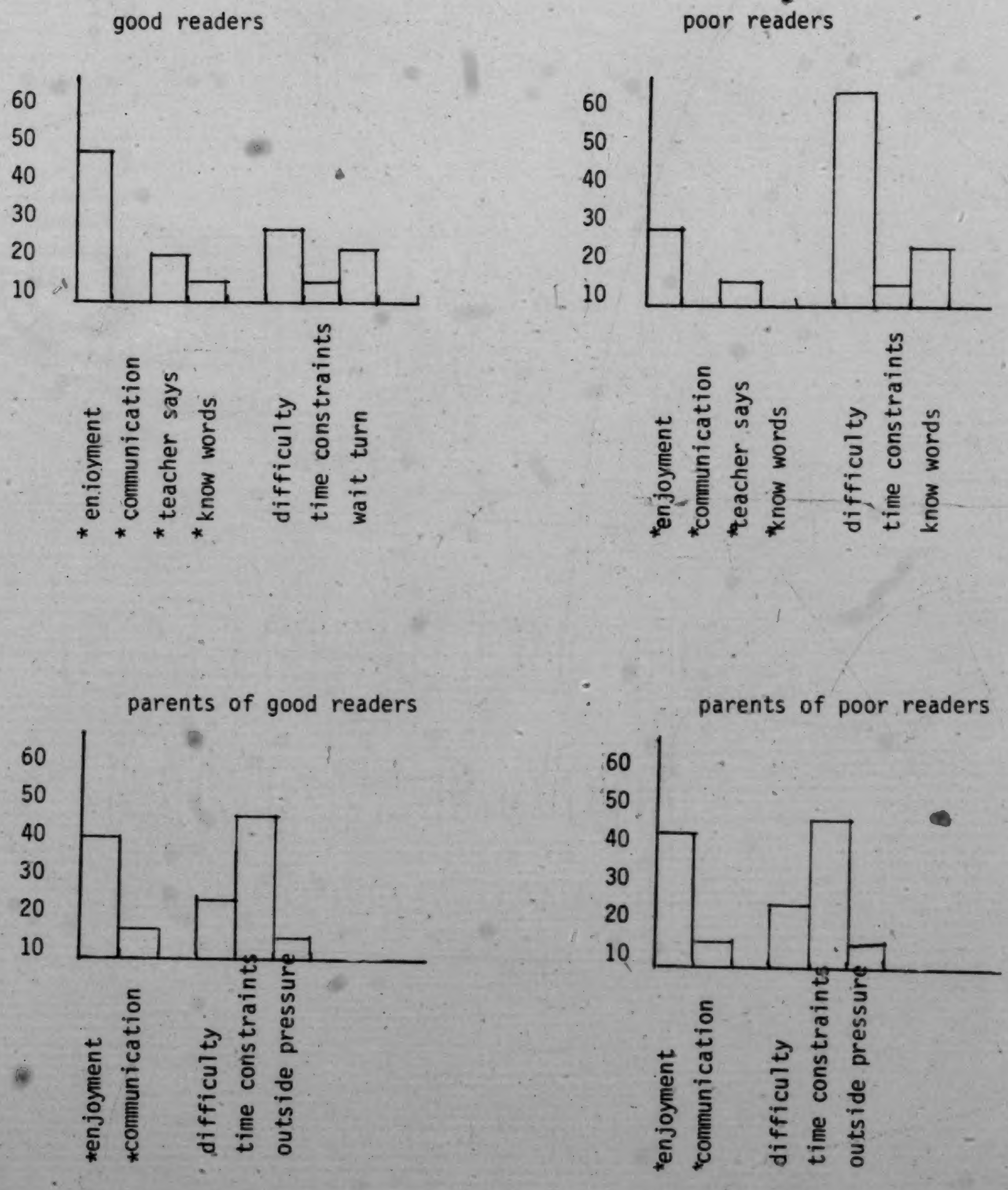


Figure 5

Reasons for Reading Preferences

readers indicated that reading was difficult for them. "I don't know hard words and stuff". "It's kind of hard...like one of those hard words like 'indebility' and I don't get it and I get it marked wrong". Perhaps these subjects felt that they were supposed to like reading even if they experienced difficulty with the task. Alternately, perhaps they really did like reading which would confirm, in part, the results of Mason's (1967) study where the children stated they liked reading although they could not read.

The responses of the good readers appear to be more consistent than those of their peers. Seventy percent of the above average comprehenders said they liked reading, giving enjoyment as their main reason. "I like it 'cause there's fun things, like stories and things in it". "I like to read to other people and I like reading letters from my grandma". Only 20% of this group professed to finding any difficulty with reading as opposed to 54% of the poor readers. "I already know how to do it and just zip right through the book". A point of note is that neither good nor poor readers referred to liking reading as a means to discovering new information. Although one comprehender spoke of his facility in reading enclyopedia and dictionnaires, the size of the books was more important than the data they contained. "I read enclyopedias and dictionnaries and big books like that". It is the opinion of this researcher that these young children may have not yet conceptualized the finding out of new and interesting information as pertinent to the schemata for reading for themselves, although they appear to realize that this is one of the main reasons adults read (See Figures 7 and 10).

While 60% of the parents of poor readers claimed they liked reading, 70% of the parents of good readers professed to having mixed emotions on the subject. However, the reasons presented by both groups were very similar, regardless of their initial choices. Although enjoyment was cited as being important to 33%, time constraints preventing them from engaging in reading accounted for nearly 40% of the replies. Many found that reading interfered with their daily schedules, that they felt guilty if they read when they should have been doing "more constructive work". "Finding the time is hard; I don't have much time anymore with the kids and work and stuff; they come first to me". It is interesting to note that 20% of the adults considered themselves as having difficulty with reading, nearly the same percentage as that of the good readers. The parents contended that the inadequacy stemmed from their own early experiences in reading which influenced their present ability to read. "When I started school there was none of this pronouncing words; that was by memory only". "The easier words, no problem, but when I get to the harder ones, I've trouble. It's too bad I can't do it (decode)".

In analysing the percentage of responses, it appears that there may be a relationship between the adults and the good readers in the area of reading for enjoyment. However only 25% of the poor readers seem to have realized that pleasure can be derived from reading. As they have not yet attained fluency in the reading task, reading by their own admission, is a difficult task and may therefore be less enjoyable in spite of their professing to liking it. Fluent readers move into the enjoyment of the act as they process the information in the text while poor comprehenders may be so textually constrained as to disallow enjoyment.

Question 2

How Often Do Parents and Children Read at Home?

The distribution of responses per category are located in Figure 6.

The parents of the poor readers professed to reading on a daily basis more frequently than any of the other three groups. The newspaper was the reading material most often cited, with books taking a low priority. "I'll sit down and read the newspaper right through after supper". "I just never get into a book, you know, 'cause it takes too long to get through". A point to report is that none of the adults referred to reading to their children. An explanation could be that the parents did not see this participating situation as reading per se, and inferred that the researcher was only seeking to discover their own personal reading habits. However, as their offspring were experiencing considerable difficulty with reading, one wonders if these children were still being read to and if their parents just failed to mention that fact as an example of their reading habits.

Rather surprisingly, only 30% of the good readers read on a daily basis. Their responses indicated that they had many interests other than reading and as the interviews were conducted during a particularly warm spring week, it is possible their memories failed them. "Sometimes I read; sometimes I go out on my roller skates". "I read every day when I can't take out my bike".

It appears evident that all subjects read at home and the relationship between how often parents and children read is somewhat consistent. Eighty percent of the parents read at least twice a week, or

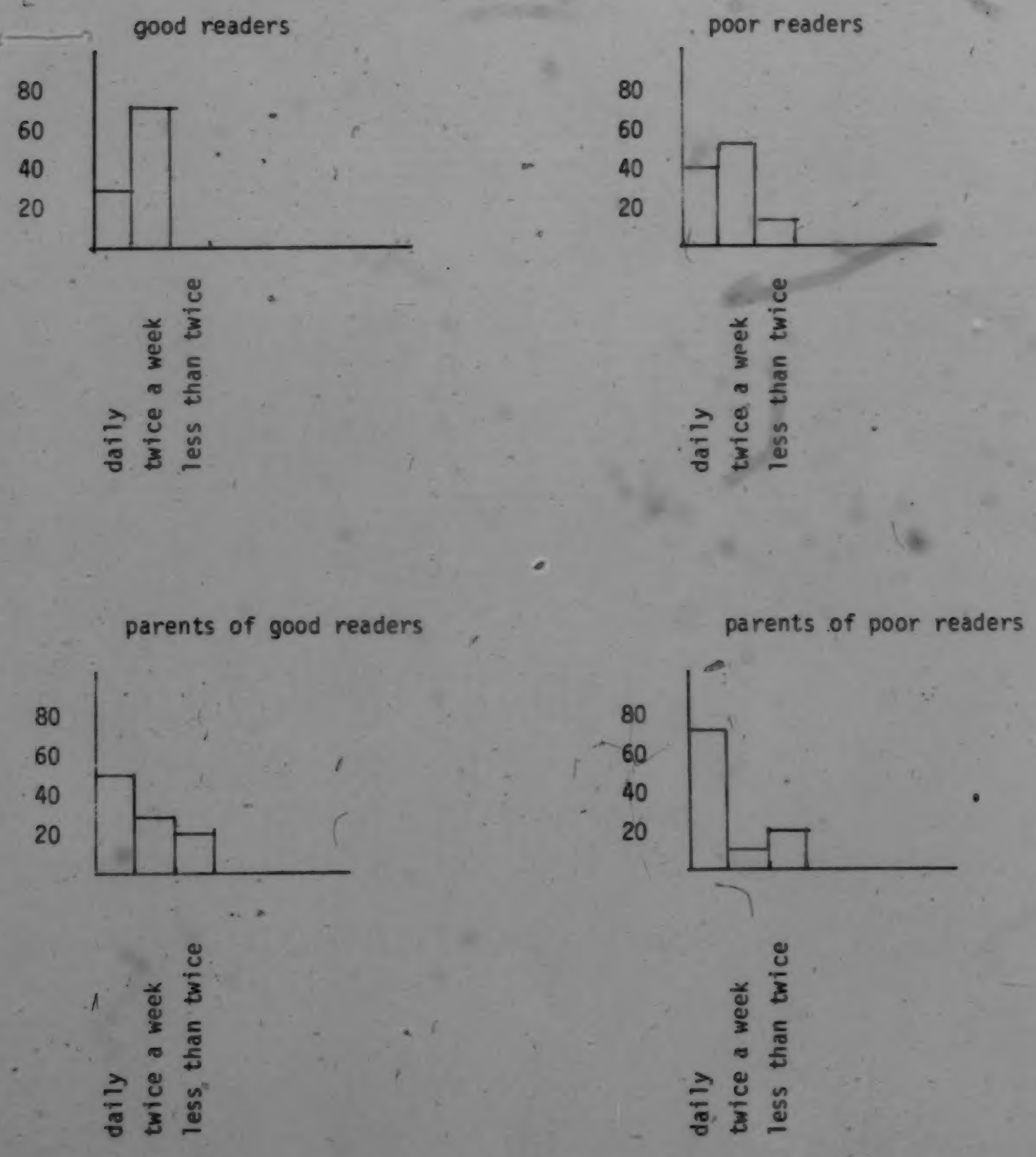


Figure 5

Home Reading Frequency

more frequently. Approximately the same figure holds true for their children.

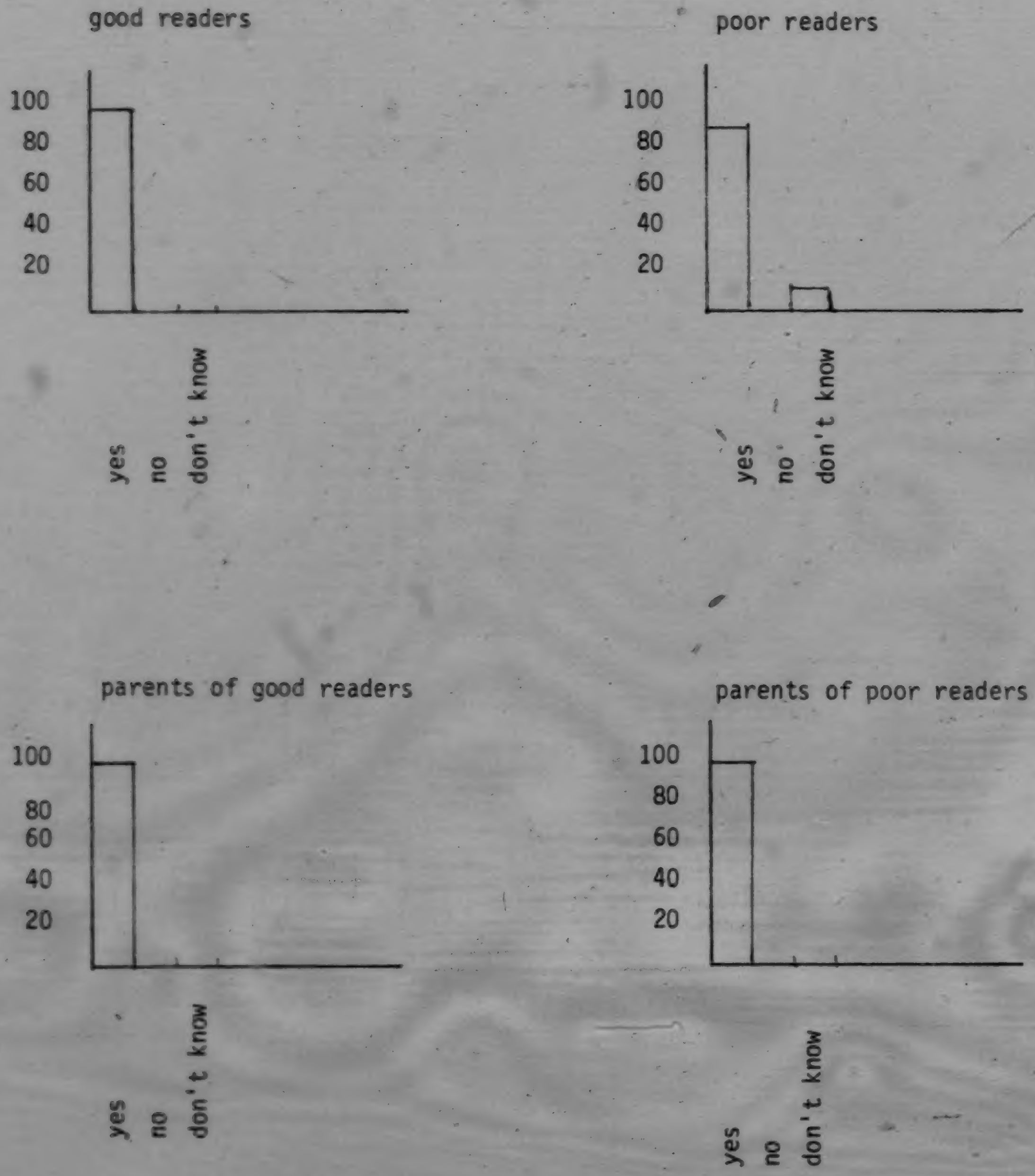
Question 5

Do parents and Children Observe Others Reading at Home or in Their Environment?

Figures 7 and 8 give the results to this question. It must be noted that the subjects were not asked what their own reasons were for reading at home or in their environment; the intent of the question was to discover what purposes others had for reading outside of a school setting. Overwhelmingly, the responses of all subjects indicated that reading was being done at home and in the work environment.

The parents of the good readers claimed that those whom they observed reading at home, e.g. spouse, relative or offspring, were involved in the process for enjoyment purposes. "My own mother, for example, reads for fun. She likes to fill her time at that rather than T.V. or things". The 23% who offered communication as a reason referred to the work situation. They mentioned that pleasure reading was frowned upon by employers even if the employee did not have sufficient work to fill the hours. "We used to be able to take a book to work and read, when we weren't busy, but now they've done away with that".

While 58% of the parents of poor readers viewed communication as the main purpose for home or work reading, 42% contended that enjoyment was the prime reason. These results are very consistent with their replies to question 3 (See Figure 10). The adults in the group referred to their spouses or relatives as those they saw reading. None mentioned their own child or other siblings. This leads one to assume that perhaps the poor


good readers

poor readers

parents of good readers

parents of poor readers

Figure 7

Observations of Home Reading

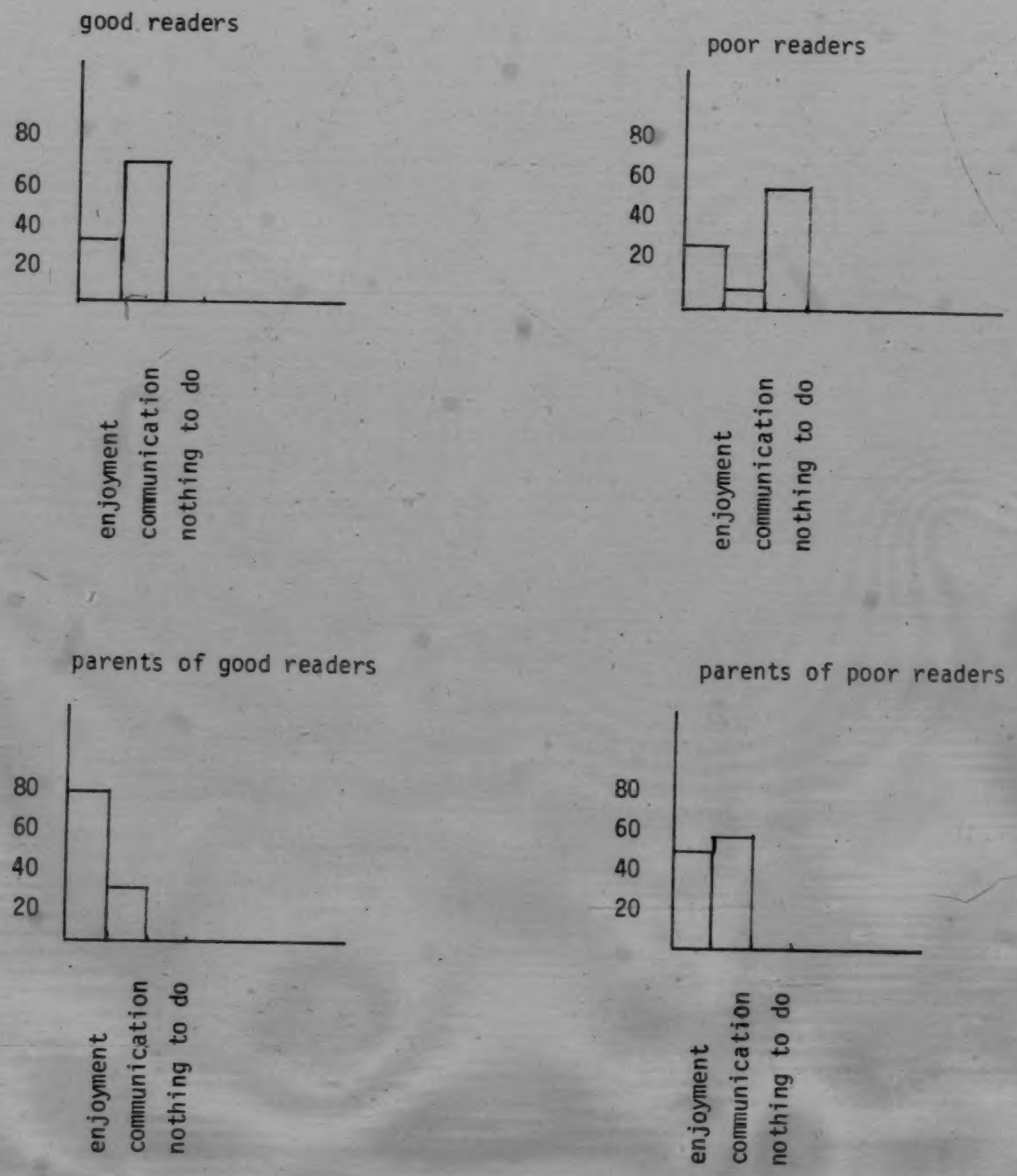


Figure 8

Reasons for Home Reading Practices

readers did not read much, if at all, at home, which appears to be inconsistent with the children's replies to question 2 (See Figure 3). An alterative explanation may be that while these same children do read at home, their parents viewed such reading activity as school prescribed and therefore failed to mention it. The parents of good readers, however, referred constantly to their own children as examples of those they saw reading at home. "_____ has started reading the sport's section". "_____ reads her library books and the ones she brings home from school just about every day".

The good comprehenders saw communication as the main purpose for their parents reading. "Well he looks at the newspaper to find out what happened". "My mom reads her nurse book so she can take care of the baby". It must be noted that perhaps much of the reading activity in the home is accomplished by the parents after their young children go to bed, when the adult can read for enjoyment without fear of interruption. "I have to have complete silence when I read and no distractions" was the way one parent phrased it. If such were the case, the child would have less opportunity to see a parent reading for pleasure.

Fifty eight percent of the poor readers considered that their parents read because they had nothing else to do. S: "When my mum has finished the dishes, she reads". I: "Why do you think she reads?" S: "Cause everything's done and she's nothing to do". Sixty percent of the poor readers did not indicate that they had formed concepts of reading for enjoyment or communication purposes. These results confirm the findings of Edwards (1962) and McLaughlin (1978), but appear inconsistent with their own responses to the question concerning the importance of reading, (See Figure 9) where reading to learn was of prime importance. Perhaps an explanation could be that these children did not realize that adults also learn through reading. Good readers, on the other hand, appeared to have developed a schema for reading that contained features for learning and enjoyment as main components of the reading task.

Figures 7 and 8 appear to demonstrate that while all the subjects are exposed to others reading in the home environment, the purposes for this activity are not viewed as being similar among all the groups. Again, poor comprehenders were more unlike those of any of the other three groups.

Question 3

Do parents and children consider reading to be important?

Overwhelmingly, all subjects considered reading to be important (See Figure 9). The reasons for this emphasis varied among the groups (See Figure 10). While all parents and good readers were of the opinion that communication and enjoyment were the prime reasons for the importance, the poor comprehenders appeared not to have developed a schema for enjoyment as it applies to the importance of reading. This is in keeping with the majority of their responses to Question 1. For the present question none of them alluded to the pleasure one derives from reading which was evident in 33% of the responses of the good readers. "Because it's (got) so much exciting things and scary things". If a focus of pleasure is missing in the reading schemata for these children, one may assume that they will not be inclined to read for relaxation or enjoyment. Rather they will approach the task only when so directed by outside pressures-- e.g. the teacher in school or the parent who

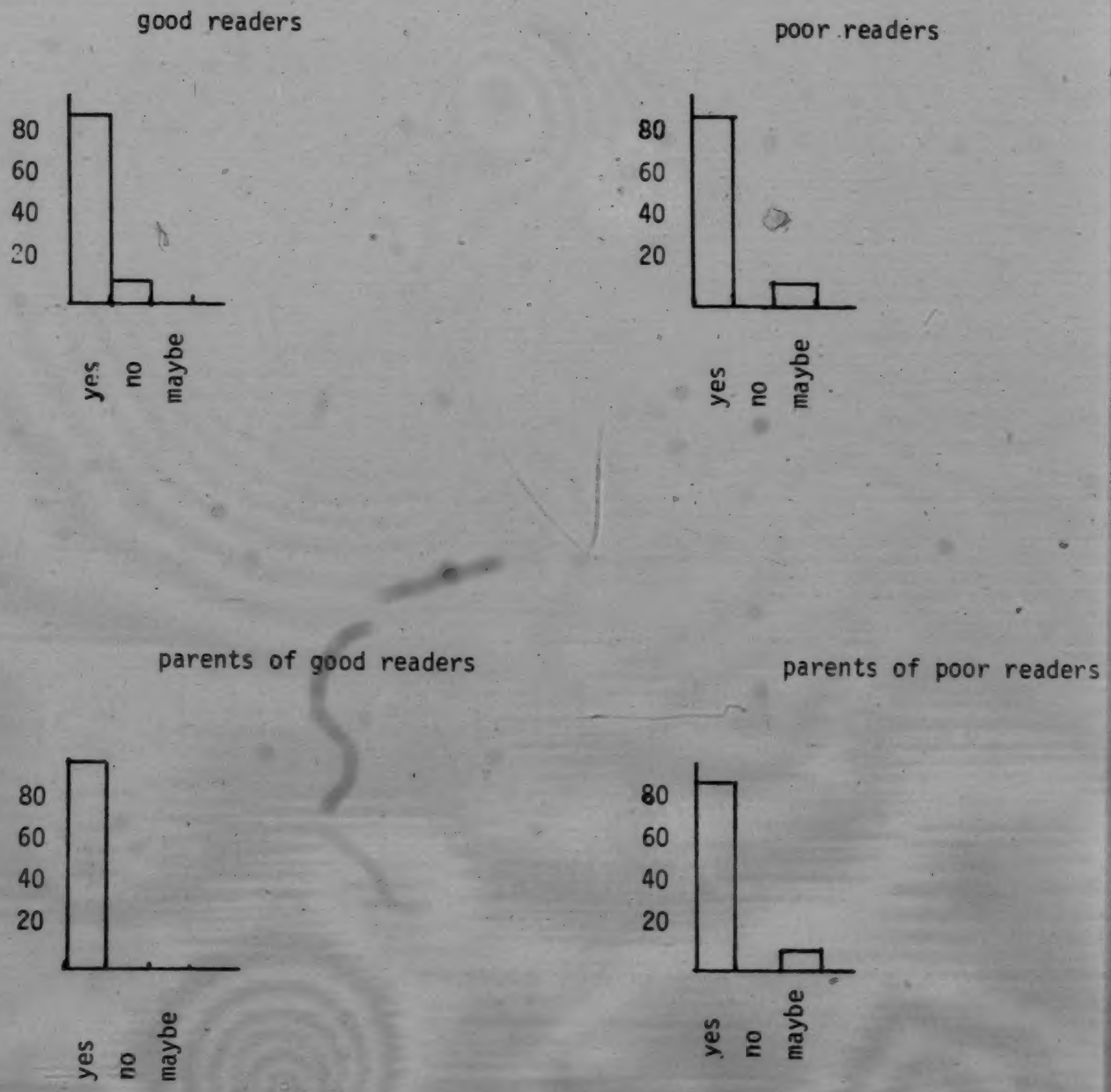


Figure 9

Is Reading Important ?

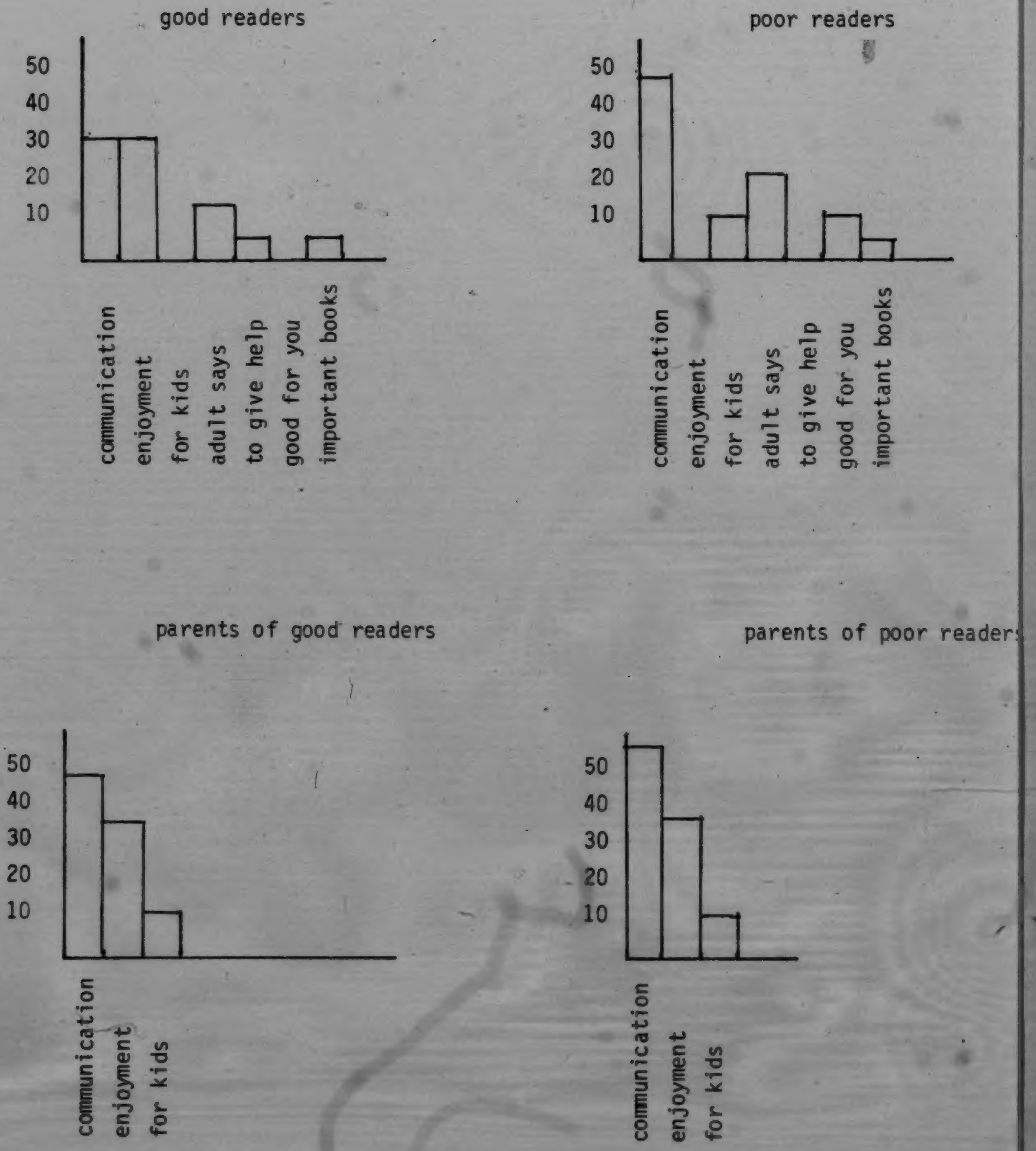


Figure 10

Reasons for Importance of Reading

supervises the homework. Furthermore, 23% of the poor readers indicated that reading was important because some adult had told them so. "Well my mum says it is so I can drive and things when I grow up". If this group has internalized the importance of reading as the outcome of an adult directive, rather than being self-motivated, it may be that they do not realize what they themselves bring to the text is important to its interpretation. Reading for future success may detract from reading in the present for pleasure or enjoyment.

All subjects considered reading to be important for communication purposes. There would seem to be a relationship between the parents' and children's concepts in this particular area. However this is not in keeping with their responses to the question as to why they liked or disliked reading (See Figure 5). In the present instance, the subjects' replies focused strongly on learning "cause you get to learn lots of things, like about mice and things". "You can't learn much without reading and as an adult you learn everything through reading and can apply that knowledge". One may assume that if learning is what the subjects view as being important, it may not be considered enjoyable. Rather reading to learn is thought of as something one has to do, as opposed to something one likes to do. Over 10% of the parents' responses indicated that reading was important for their children, if not necessarily for themselves. "Its important for kids 'cause they're just learning; for myself, it's not so important, I think". These responses did not clarify whether these adults were emphasizing the mechanics of reading as opposed to the overall concept of reading as an interpretative process. The researcher is of the opinion that while these parents may be encouraging a reading for learning concepts in their children, they may not be models themselves as readers for learning in the home environment.

In summary, for this question related to the importance of reading, a relationship appears to exist among the four groups. Also communication as the main reason for professing such a belief is indicated with some consistency among the groups. Poor comprehenders, however, appear to be lacking the concept of enjoyment as a reason for reading importance.

Question 4

At What Age Do Parents and Children Think Fluency in Reading is Attained?

The results for this question are presented in Figure 11. With the exception of the group comprised of poor readers, all subjects were of the opinion that fluency is attained by the age of nine, or in other words, by the end of grade three. Their reasons (See Figure 12) were based primarily on the examples provided by sibling models or the general maturity of readers at that age. "My brother's eight and he's a good reader." "Our older daughter ________ read well by grade three". "They're old enough by then (grade three) to understand what they read". Some of the good readers considered themselves fluent readers. "Well I'm seven and I'm a pretty good reader". They appeared to have realized that proficiency was possible even at their own present age and that one did not have to wait until the distant future to achieve mastery of the reading task.

However, 70% of the poor readers thought that fluency would come at a later age, 10 years or older. "When I'm bigger, I'll read better". The implication of such responses indicates that if poor readers do not expect to attain fluency until they are much older, they may not be

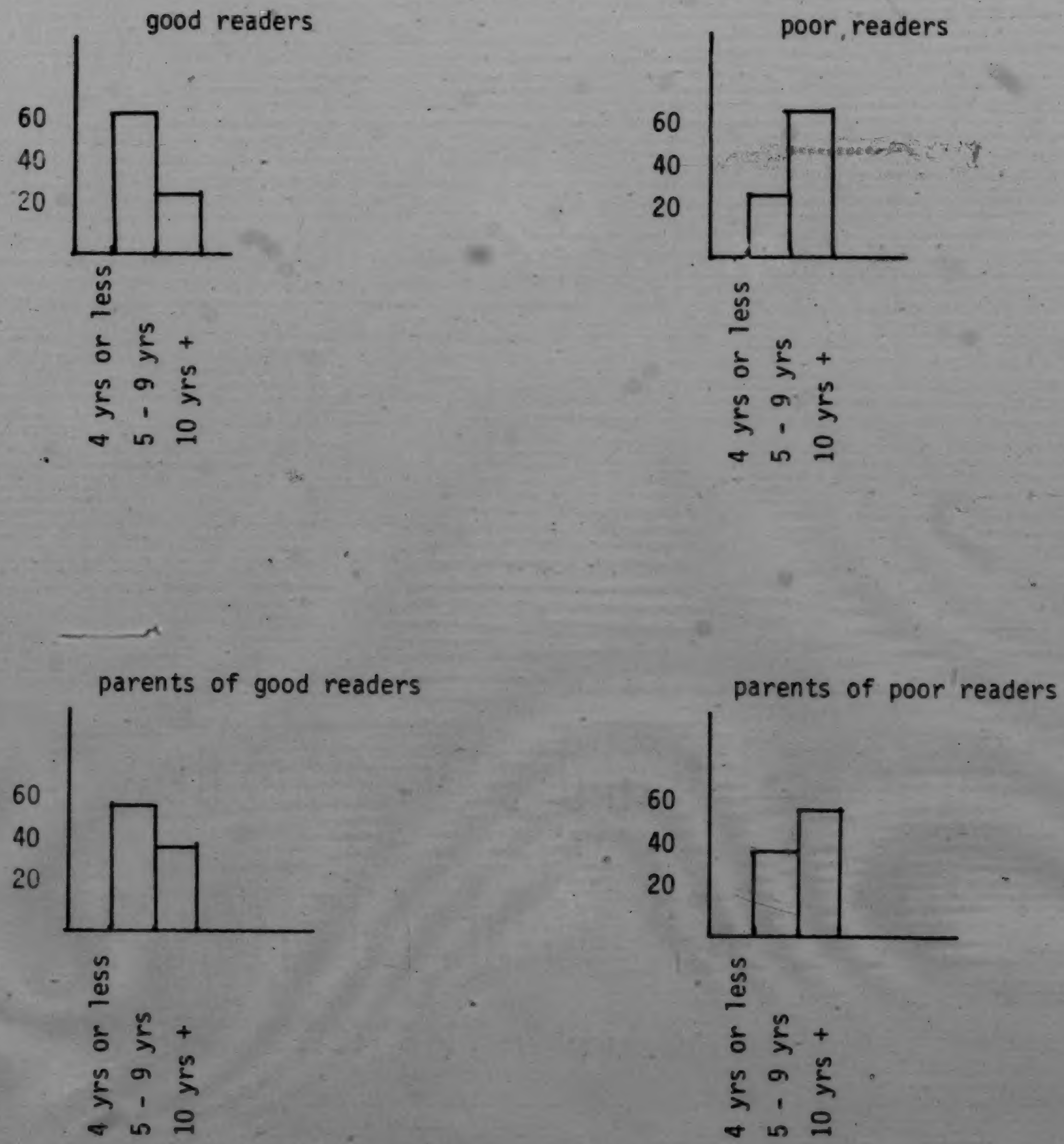


Figure 11

Age of Reading Fluency

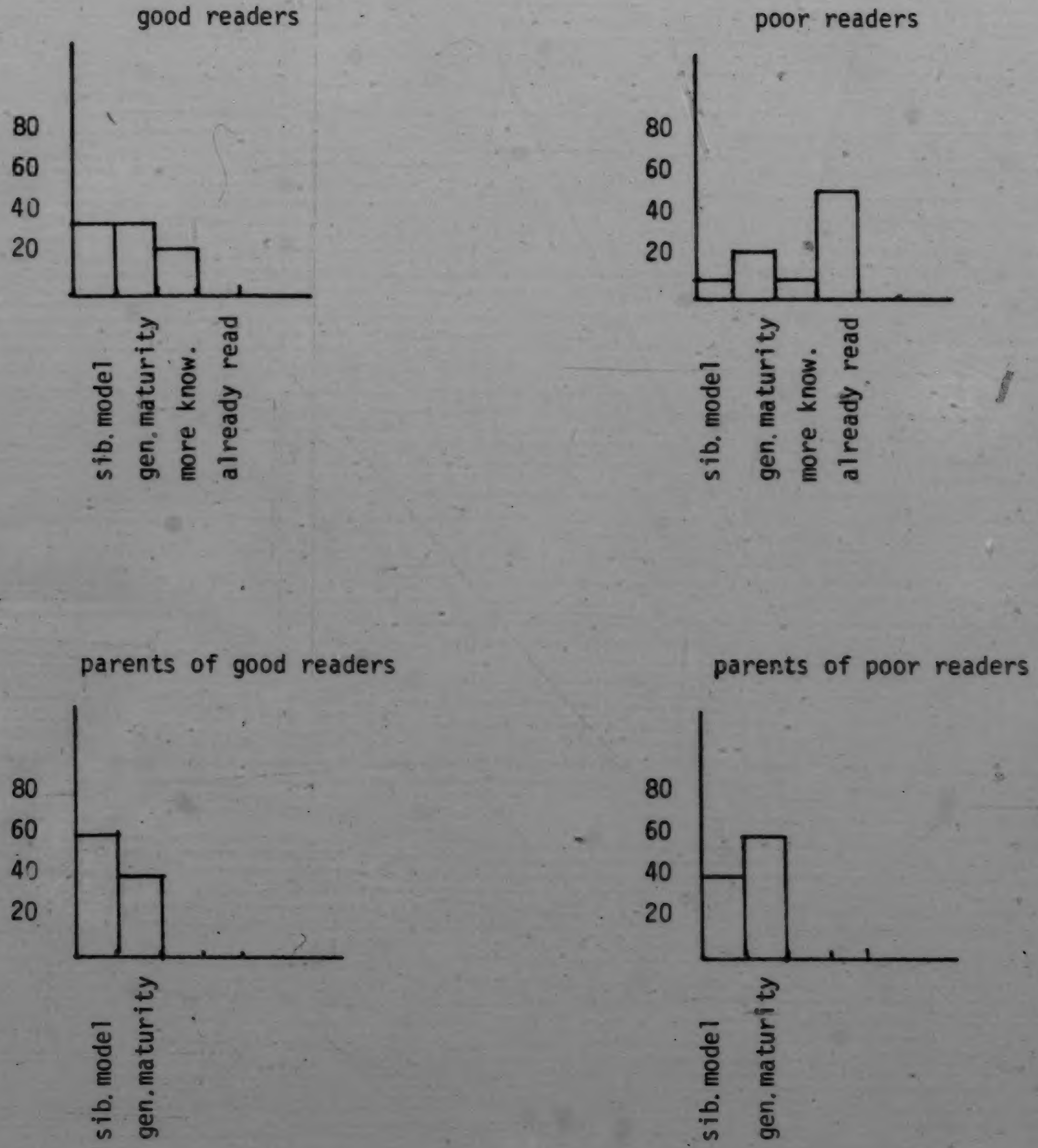


Figure 12

Reasons for Age of Fluency Choices

approaching the reading task with the same expectations of success as good readers. In other words, they may think that mastery of the art will come about as a by-product of age rather than as a result of their own personal involvement and efforts. In analysing the responses created by the poor comprehenders, one discovers that they were of the opinion that they would already be reading by that age; that is, they provided circular responses. "Well, you're old when you're 12 and you'll know more reading when you're old, like 12". "'Cause you'll already know reading and you won't fool around and stuff". Another explanation could be that poor readers rationalized their present reading performance as a result of not being old enough to be fluent readers. In other words, they could not read with fluency until they were older.

Interestingly, only 40% of the parents of poor readers mentioned sibling models as examples of successful readers and considered maturity to be of more importance in the attainment of fluency. "When they're older, they'll understand better what's happening". It is the opinion of this researcher that these parents may not be expecting their children to be successful readers in their present grade and may be waiting for their offspring to grow up before attaining fluency.

In analysing the responses, there does not appear to be a relationship between the concepts of fluency attainment held by poor readers and those of the other three groups. The similarity of replies between good readers and parents indicates that the former may be approaching an adult-like understanding of when reading fluency is attained.

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THE UNIVERSITY OF ALBERTA

THE INFORMATION SEEKING BEHAVIOR OF UNDERGRADUATE STUDENTS IN AGRICULTURE AND FORESTRY AT THE UNIVERSITY OF ALBERTA

by

KATHARINE ALIX HAYDEN

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF LIBRARY SCIENCE

EDMONTON, ALBERTA
FALL, 1988

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Date: August 12, 1988

Knowledge is of two kinds:
we know a subject ourselves
or
we know where we can find
information upon it.

Samuel Johnson, 1775

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled "The Information Seeking Behavior of Undergraduate Students in Agriculture and Forestry at the University of Alberta" submitted by Katharine Alix Hayden in partial fulfilment of the requirements for the degree of Master of Library Science.

AM Schrad..........
(Supervisor)

....

....

Date: August 12, 1988

DEDICATION

This thesis is dedicated to the memory of my brother Kieran, whose mathematical mind could not understand why someone would need a masters degree in order to put books on shelves.

ABSTRACT

The purpose of this study was to identify and compare the information sources that first-year and fourth-year undergraduate students in the Faculty of Agriculture and Forestry at the University of Alberta, choose to satisfy their academic information needs. In addition, the study investigated the relationship between specific psychological needs that influence undergraduate student information seeking and the information sources chosen by them to satisfy those needs.

Data were collected from two major sources: a questionnaire and critical incident interviews with self-selected volunteers. The questionnaire sample was comprised of 57 first-year students and 69 fourth-year students. This sample represented 40 percent and 47 percent of the total enrollment of first and fourth year students respectively. Twenty-two students, 11 from each year, participated in the interviews.

The data suggest that the type of course requirement influences the choice of information source. Students tend to choose a formal source, such as a library, for term papers and seminars, and an informal source, such as a teaching assistant and friend, for labs and seminars. It was discovered that some of the information sources chosen by first-year and fourth-year students differ significantly; however, the university library was considered to be the most important information source by the majority of students in the study. In addition, information sources were chosen mainly because of pragmatic reasons, rather than psychological.

Implications for further research, for librarians and practitioners are also presented.

ACKNOWLEDGEMENTS

My thanks to Dr. Alvin Schrader for supervising this work. Appreciation is also expressed to Dr. Shelia Bertram and Dr. Mick Price who served as committee members, and to Chris who was always available to offer assistance with statistical problems.

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CHAPTER I

STATEMENT OF THE PROBLEM

A. THE PROBLEM

Agriculture and forestry have been, and continue to be, the most important primary industries in Canada, contributing major economic and social benefits to Canadian society as a whole. Research and development constitute the key to their continued progress.

Agriculture is founded on the purposeful management of living things -- plants, animals, and microorganisms. It is a multidisciplinary mission-oriented science. Research results are applied to existing knowledge for the direct and immediate solution of problems. Agriculture has become a large and complex industry concerned with the production, processing, transportation, and marketing of agricultural products. New concepts and technologies are rapidly evolving and changing. Research is the link to social benefits.

Forestry is the "science, business, and art of managing and conserving forests and associated lands for continuing economic, social and environmental benefit" (Science Council of Canada, 1973, p. 22). It involves the management of forested lands and wildlands for the variety of uses and products that may be derived (Murphy, 1983). Forest land managers are concerned with the use of quality forest lands for agricultural and other non-forestry products. As forest land is reduced, future forest production will have to be met from a smaller land base of lower quality. Research and development efforts have focussed on forest renewal and protection. In recent years, the federal government of Canada has begun to coordinate and strengthen forestry research and develoment at the federal and provincial levels, in the private sector, and in

Canadian universities. It has also begun to improve the level of support for technology transfer (Government of Canada, 1985).

Issue by issue examination of the *Quarterly Bulletin of the International Association of Agricultural Librarians and Documentalists* (IAALD) reveals that research has been conducted on the importance of effective dissemination and transfer of forestry and, more especially, agricultural information. For the most part, the research has focussed on information transfer through the printed medium and through online databases in developing countries. Few investigators have concentrated on agricultural and forestry information transfer in North America. In addition, researchers have not investigated the importance of informal communication networks in the agriculture and forestry fields, or in the education of students in these fields. These areas require further study.

Almost two decades ago, Brittain (1970) urged librarians and researchers to stay away from traditional user surveys. He maintained that:

> theories of information-processing that will generate propositions concerning channel selection; amount of seeking; effects on productivity of information quality, quantity, currency, and diversity; the role of motivational and personality factors, etc. are required (p. 17).

Brittain also suggested that there may be a relationship between psychological variables and information requirements, needs, and uses.

More recently, Wilson (1981) contended that past information seeking behavior studies have not addressed the central question of "why the user decides to seek information, what purpose he believes it will serve, and to what use it is actually put when received" (p. 7). He noted that research has focussed primarily on pragmatic issues, such as determining the effectiveness of existing information systems, and providing guidance on aspects of information systems design, development and operation. He argued that data were still needed on the reasons that people seek information.

These reasons, Wilson pointed out, are a reference to need. As he defined it, need refers to the concept of human needs and can be divided into three categories:

1) physiological needs - food, water, shelter, for example,
2) affective needs, that is, psychological and emotional needs - need for attainment, for domination, for example, and,
3) cognitive needs - need to plan, to learn a skill, for example (p. 7).

These categories of needs are interrelated and may motivate an individual to seek information in order to satisfy them. Wilson suggested that "it may be advisable to remove the term 'information needs' from our professional vocabulary and to speak instead of 'information-seeking towards the satisfaction of needs' " (p. 8). Wilson also suggested that the channel, or source, of information, may be guided by psychological needs as much as, if not more than, by cognitive needs.

It is necessary, therefore, from the information specialist's point of view, to be able to identify and understand the variables that influence information seeking behavior (Brittain, 1970). The present study addressed this question by focussing on the psychological needs which are motivating factors in the search for information. As Fine (1984) has observed "it is not enough to know *that* people behave as they do, we also need to understand *why* and *how* if we are to attempt to solve problems whose origins are in human behavior" (italics in original, p. 457-458).

The importance of this theoretical perspective for research into information seeking within the fields of Agriculture and Forestry is just as vital as for any other discipline, whether pure or applied.

B. PURPOSE OF THE STUDY

The purpose of this study was to identify and compare the information sources that first-year and fourth-year undergraduate students in the Faculty of Agriculture and Forestry at the University of Alberta chose in order to satisfy their academic information needs. In addition, the study investigated the relationship between specific psychological needs that influenced undergraduate student information seeking and the information sources chosen by them to satisfy those needs.

C. RESEARCH QUESTIONS

The study was designed to provide answers to the following questions:

1) What information sources do first-year and fourth-year undergraduate students in the Faculty of Agriculture and Forestry choose to satisfy their academic information requirements?
2) What relationship exists between type of information source chosen by the students and type of course requirement?
3) What psychological needs influence first-year and fourth-year undergraduate students in the Faculty of Agriculture and Forestry to search for academic-related information?
4) What relationship exists between the information sources chosen by the students and their motivating psychological needs?
5) What influence does exposure to bibliographic instruction have on undergraduate students' choice of information sources?
6) What influence does academic institution have on undergraduate students' choice of information sources?

D. RESEARCH HYPOTHESES

These questions were more formally stated as research predictions. Therefore the study hypothesized that:

1) There is a relationship between the type of information source chosen by students and type of course requirements.
2) There is a difference between the information sources chosen by first-year and fourth-year students.
3) There is a difference between the motivating psychological needs of first-year and fourth-year students.
4) There is a relationship between the information sources chosen by students and their motivating psychological needs.
5) There is a difference between the information sources chosen by students who have been exposed to bibliographic instruction and students who have not been exposed to bibliographic instruction.
6) There is a difference between the information sources chosen by students and their academic institution of first year attendance.

The null forms of the above research hypotheses were tested and level of significance for rejection of the null hypotheses was set at $p < .05$.

E. DEFINITION OF TERMS

For the purposes of the present study, the following terms and definitions were used:

1) information sources - places, people, or materials to which respondents go to get the information they need (Matheson,1979, p. 15).
2) information seeking behavior - the processes of how and from where information is obtained (Hall,1986, p. 6).

3) information - all ideas, facts, and imaginative works of the mind which have been communicated, recorded, published and/or distributed formally or informally in any format (ALA Glossary,1983, p. 117).

4) psychological need - a mental force which directs a person's activities so as to change an unsatisfying situation or maintain and promote a desirable situation (Dunn,1984, p. 8).

F. LIMITATIONS OF THE STUDY

1) The results of the study may not be generalizable to students who have access to different library resources, community facilities, faculty structure, and course requirements than the students in Agriculture and Forestry at the University of Alberta.

2) The results of the study may be subject to students' attitudes towards and the degree to which they responded accurately to the questionnaire and interview. Self-reported behavior cannot be readily verified because of factors such as memory and recall.

3) The results of the study may not be generalizable to all undergraduate students in Agriculture and Forestry as only students in first and fourth years of their programs were studied.

4) Respondents may not be representative of nonrespondents.

5) The interview volunteers may not be representative of the general sample as they were self-selected, rather than randomly selected.

CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter discusses research related to the present study in the areas of: use and user studies, information seeking behavior, and psychological aspects of information seeking.

A. USE AND USER STUDIES

Use and user behavior is one of the most investigated topics in the literature of librarianship. As Burns (1978) has noted, use and user studies are central to any understanding of information system behavior. Some of the earliest studies of library use patterns were conducted in the 1930's and 1940's. The methodologies employed have evolved since then from tabulation of circulation statistics to more sophisticated attempts to examine the user-library interface.

Bibliographies, annotations and comprehensive literature reviews of the research in this area are available (Taube, 1959; Davis and Bailey, 1964; Atkins, 1971; Bates, 1971; Wood, 1971; Tobin, 1974; Ford, 1977; Smernoff, 1984). In addition, since 1966 the *Annual Review of Information Science and Technology* has included a yearly review of research on information needs and uses.

In 1980, the Collection Management and Development Committee of the Resources Section of the American Library Association formed a subcommittee to investigate and develop guidelines for conducting use and user studies. A document was prepared (Christiansen, Davis and Reed-Scott, 1983) with the objective to provide a summary of the research methodologies being used in collection evaluation studies. Advantages and disadvantages of each methodology were outlined. The Committee identified six use and user studies methodologies:

1) circulation studies,
2) survey of user opinions,
3) document delivery tests,
4) shelf availability studies,
5) in-house use studies, and
6) citation studies.

With the exception of surveys of user opinions and citation studies, these investigative techniques focus on the use of the library, rather than on the user. The Committee did not distinguish between use studies and user studies.

Broadus (1980) provided a distinction between the two types of research. He defined use studies as those that concentrate on library materials, attempting to determine what use, or how much use, they receive. A user study, on the other hand, focuses on people and asks whether, or how much, they use the library, its materials and resources .

Research must also focus on the user's demands and needs in order for the library's collection and services to reflect those demands and needs. Butler and Gratch (1982) identified the purpose for conducting a user study:

> In general terms, the purpose of a user study is similar to market research in business. It is an attempt to discover patterns of use and levels of awareness of users toward library services, to determine success or nonsuccess of services, and to identify what adjustments are needed in service strategy (p. 322).

Along with the purpose, the ultimate goal of the user study, according to Burns (1978), is "the discovery, articulation, understanding, influencing, and, when appropriate, the elimination or at least minimization of those obstacles between a user and his information goals" (p. 6).

Burns (1978) defined the three basic types of data that user studies require:

1) demographic data - parameters such as age, sex, race, education, socioeconomic level,
2) preferential data - parameters such as reading preferences, preferred visiting hours, and location,
3) behaviorial data - involves what actually took place.

User studies need to extrapolate the preferential data to include information source preference. They need to delve into the actual information seeking behavior of users. The present study addressed this issue.

B. INFORMATION SEEKING BEHAVIOR

The term "information seeking behavior" has been used in the research literature about scientists and researchers since the 1950's. The current emphasis on user surveys has prompted librarians to investigate the concept of information seeking behavior, drawing on models from the disciplines of psychology, sociology, and communication theory. Most studies, however, have concentrated on the means by which individuals find information rather than upon the ends served by the information seeking behavior (Wilson, 1981). Researchers have focussed on how people should be seeking information rather than investigating the actual demands that people make in order to satisify their perceived needs. Of importance is the environment in which the need is perceived. The information required must be in the context of the user's everyday life where the need is first perceived. Chen and Hernon (1982) maintained that

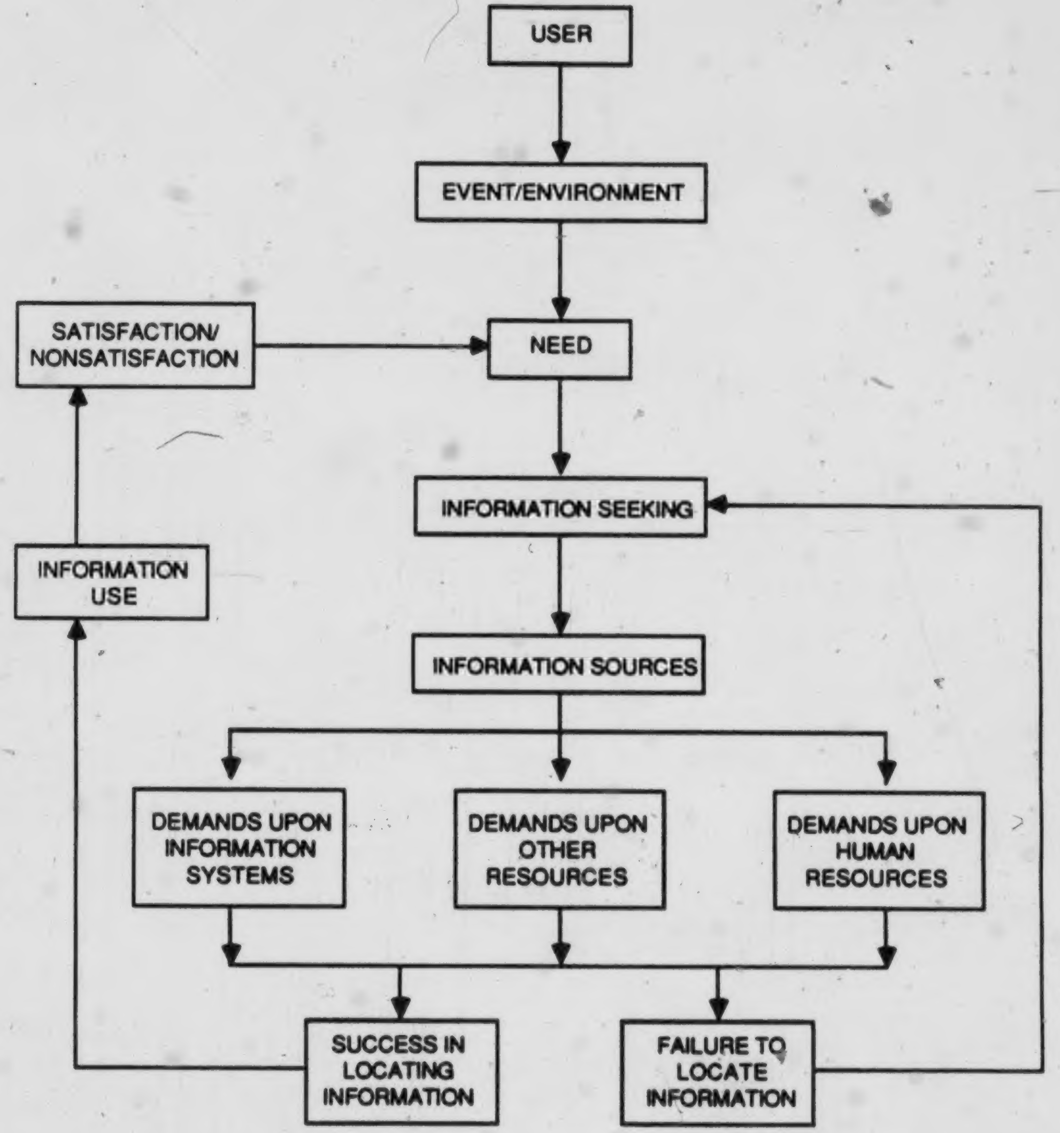
> any attempt to depict general trends and tendencies in information seeking must admit the human individual as the center of the

> phenomenon, consider his or her view, need, options, and prejudices as significant and influential elements deserving investigation (p. 6).

A view of information seeking behavior is illustrated in Figure 1. The diagram illustrates the relationships between the concepts of user, need, uses, and user behavior. It is adapted from Wilson's (1981) figure of "Interrelationships among areas in the field of user studies" and Krikelas' (1983) model of "Information seeking behavior".

The diagram suggests that the user perceives a need in the context of the user's environment. That is, in a given environment or event, the user will perceive a need. The perceived need will lead the user to search for information, making demands upon a variety of information sources. These information sources include information systems, such as, university libraries and public libraries; human resources, such as, scientists, researchers, and friends; and other resources, such as, personal collections and media. Information seeking behavior may lead to either a success or a failure. If successful, information is located which will be used. This may result in the satisfaction or nonsatisifcation of the original perceived need. Satisfaction occurs when the located information has been processed and satisfies the original perceived need. Nonsatisfaction occurs when the information does not satisfy the original perceived need. With nonsatisfaction, the information seeking process may be repeated until satisfaction occurs. A failure to find information may result in the process of information seeking being continued. Krikelas (1983) stated that "information seeking begins when someone perceives that the current state of knowledge is less than that needed to deal with some issue (or problem). The process ends when that perception no longer exists" (p. 7). That is, the information seeking process ends when the perceived need has been satisfied.

FIGURE 1
INFORMATION SEEKING BEHAVIOR MODEL


USER
EVENT/ENVIRONMENT
SATISFACTION/ NONSATISFACTION
NEED
INFORMATION SEEKING
INFORMATION USE
INFORMATION SOURCES
DEMANDS UPON INFORMATION SYSTEMS
DEMANDS UPON OTHER RESOURCES
DEMANDS UPON HUMAN RESOURCES
SUCCESS IN LOCATING INFORMATION
FAILURE TO LOCATE INFORMATION

Adapted from Wilson, 1981, p. 4 and Krikelas, 1983, p. 17

C. INFORMATION SOURCES

Inherent in information seeking is the concept of information sources. Two factors related to the use of information sources have received attention: the use of formal versus informal sources, and the reasons why certain information sources are chosen.

Generally, formal information sources are the types of materials that are found in libraries, such as books, periodicals, indexes, and abstracts while informal information sources are comprised of conversations with colleagues, friends, relatives, and personal communications. Ford (1973) postulated that formal sources of information are readily available for use by many people at different times. Informal sources, however, operate on an individual, interpersonal basis.

1) General Studies

In contrast to library use, few studies have been conducted on the information seeking behavior of the general public. One of the first such studies was conducted by Parker and Paisley between 1964 and 1966. The researchers interviewed 1869 adults in two California communities to find out "what kinds of people seek what kinds of information through what channels" (1966, p. I/1). Specifically, respondents were asked about their use of adult education, mass media (for example books and libraries) and interpersonal information sources. It was discovered that, while men were more inclined to use interpersonal sources for business and financial information, women used such sources for health and welfare information. In addition, it was found that both men and women sought their business-related information more frequently from experts than from friends. Friends were an important interpersonal source of information when the need related directly to the home or entertainment.

The researchers cross-tabulated the responses by subject age, sex, education, occupation, income, and length of residency in the community. The results indicated that the sources most commonly associated with information (for example, newspapers and magazines, non-fiction and reference books, and libraries) were more frequently used by adults who had some exposure to college than by adults whose formal education was high school or less. Education was the strongest predictor of use of mass media for obtaining information. In summary, then, the results demonstrated that informal sources were an important source of information for the general public.

Other researchers (Warner & Murray, 1973; Palmour, 1979; Chen & Hernon, 1982) have investigated the general public's information seeking behaviors and have arrived at the same conclusions as Parker and Paisley (1966): personal, informal information sources are used with greater frequency than either media or institutional (for example libraries) information sources. Because of these findings the present study included sources of informal information among those chosen by undergraduate students in relation to their coursework.

2) Scientists and Researchers

Allen (1966) maintained that

> information processing is now and always has been the basis of scientific activity. As physical systems consume and transform energy, so does the system of science consume, transform, produce and exchange information (p. 1-1).

Researchers, therefore, have been interested in describing the flow of information in a scientific environment. One of the first researchers, Herner (1954), interviewed workers in pure and applied science in order to determine their information seeking habits. Herner discovered that the workers derived a median of 60 percent of their information from scientific literature. The scientists did use verbal sources of information, but not to as a great extent as scientific literature.

Allen (1966) conducted an indepth analysis of the flow of technical information among engineers. The subjects were engaged in research projects, and based their responses on their information activities related to the projects. Data were gathered through several methods: time allocation forms which were submitted by participating engineers; periodic progress reports; "solution development records" which provided a weekly estimate of the probability of adoption of a possible solution to a technical problem; and post-project interviews.

Allen drew a distinction between information in science and in technology.

> Information in science retains its verbal form throughout the process; as a result it is readily contained and stored in a written form. In the case of technology, information is used to direct and mold the energic inputs which become the final product. And excepting the extent to which transformed information is produced as a by-product, it loses its form and becomes coded in the structure of physical output (p. 1-1, 1-2).

Allen argued that it was necessary to distinguish between two kinds of information because of his discovery that there were differences between the information seeking behaviors in science and technology. Scientists were found to rely more heavily upon written sources than oral sources of information, while for technologists the pattern was reversed. Allen concluded that formal sources and informal sources are important to both scientists and technologists, but to varying degrees.

Allen identified three methods of information gathering common to science and technology:

1) literature searching,
2) consultation with technical staff, and
3) consultation with sources external to the organization.

The first method refers to formal sources of information; the other two methods refer to informal sources of information. Allen found that the proportion of time spent on information gathering varied significantly over the duration of projects in both science and technology. Information gathering was at its maximum during the initial portion of a project, tapering off during a second phase, but then rising again during a third phase. This cycle was true for both science and technology.

These findings have important implications for interpreting the results of user surveys. For example, if a large proportion of the respondents in a particular study were in the initial phase of their projects, information gathering would be overreported. Project phase must therefore be taken into account in conducting user studies.

Allen's study is important for highlighting the difference between the two modes of investigation in science and technology, and for his discovery that a corresponding difference exists in information seeking behaviors.

Other studies (Menzel, 1958; Paisley, 1966; Rosenbloom & Wolek, 1970; Brittain, 1970; Lipetz, 1970; Friedlander, 1973; Quaglieri, 1982) support Allen's (1966) claim that both formal and informal information sources are important to researchers in science and technology.

More recently, Salasin and Cedar (1985) undertook a survey of applied researchers, policymakers, and practitioners in the field of mental health services. They investigated the following aspects of information seeking behavior:

1) respondent demographic characteristics,
2) respondent use of various information sources
3) relative importance of these sources, and
4) personal contacts outside the respondents' organization (p. 94).

They discovered that the respondents rarely sought information from outside their organization. Indeed, 80 percent of their information seeking activity involved intraorganizational person-to-person communication. Differences were observed in the sources of information used by individuals in different work roles and settings. Their survey findings were consistent with previous studies.

In light of these studies of the flow of information among practictioners of science and technology, the present study focussed on students in one area of science and technology, agriculture and forestry, in order to determine whether their information seeking behaviors were consistent with those of the professional researchers.

3) Students

Few studies have focussed on the student as an information seeker. Most research has concentrated on library use by undergraduate and graduate students in an academic environment. Generally, it has been found that proportionately few students use the university or college library. If students do not use the academic institution's library, the question is raised of how and where they find the information which they need in order to satisfy their academic studies.

Recently, librarians and researchers have begun to address this issue. Whitlatch (1983) discovered that more than half of the 1,470 surveyed undergraduate students at San Jose State University used community libraries in connection with their coursework. She did not investigate the reasons why students used an information source other than the university library, nor did she attempt to identify other possible available information sources.

Day and McDowell (1985) investigated the information use and needs of 25 art and design students in Great Britian. Students were interviewed to ascertain how they found the information they needed, and what part, if any, the library played in their search for information. They discovered that published information was not necessarily the most important source to students. The authors noted that, given the nature of student work and course requirements, the approach to information "could involve visiting shops to look at products or designs currently available, writing to manufacturers, observations or doing their own markert research" (p. 34). In addition, the researchers described the amount (such as frequency of visits and number of items borrowed) and type (such as browsing and literature reviews, current awareness) of library use by the students. The fact that other sources of information were available was recognized by the researchers, but the study's core issue was library use.

Dunn (1984) appears to be the only researcher who has concentrated solely on the nature of the information sources chosen by students, rather than on students' use of the library. She surveyed 566 undergraduate students in all years at Loma Linda University in California, concentrating on their information seeking behaviors. Loma Linda University is an educational institution which emphasizes spiritual and religious values as well as academic achievement. At the time of Dunn's study, it had an enrollment of 1,700 undergraduate students.

Dunn's research included investigation of the psychological needs that motivated a student to search for information, as well as the different sources of information that the student chose. Her methodology included both unstructured and structured interviews. From the interviews, Dunn identified the following formal sources of information that were used by the students: college and university libraries, departmental libraries, public libraries, and special purpose libraries. The following informal sources were identified: teachers, experts in the field, classmates, husband or wife, and friends. In total, sixteen sources of information sources were reported by the students.

Based on the interviews, Dunn constructed a questionnaire that was distributed to undergraduate students during class periods. The subjects of the study included only those students who went beyond course requirements when seeking information. Results showed that students ranked teacher as the most important source in satisfying information needs, followed by library, expert in the field, and personal library. Dunn concluded that authoritative, informal sources are often chosen first, followed by authoritative, formal sources (p. 141).

Limitations are evident in Dunn's research. Although she attempted to determine whether there was a relationship between information source chosen and motivating psychological need, she did not directly ask the respondents why they deemed an information source to be important. This question would seem to be a crucial part of the knowledge which is needed about information seeking behavior, and it was accordingly one of the primary aspects addressed in the present study.

4) Factors Influencing Choice of Information Source

Given the wealth of information sources available, what makes a person choose one source over another? It has been hypothesized that certain factors will affect the choice of an information source. In the 1950's, Menzel (1958) conducted a study of information exchange among biochemists, chemists and zoologists. He discovered that these scientists frequently used interpersonal, informal sources for obtaining information related to their research. Menzel concluded that the selection of an information source is dependent upon the anticipated utility and anticipated cost of the information required.

Ford (1973) suggested that two factors which influence the choice of information source are accessiblity and perceived quality of the sources. He found that the concept of accessiblity encompassed costs, distance to be travelled, and availability. Other researchers have also concluded that accessibility, availability, and ease of use are the determining factors in choosing an information source (Rosenberg, 1967; Allen, 1977; Friedlander, 1973).

From the literature, Hardy (1982) identified two models of source selection in information:

1) the "cost/benefit model" in which the information seeker is concerned with the expected benefits and costs of using an information channel and chooses an information source on that basis, and
2) the "least-effort model" in which the individual selects the information source that requires the least amount of expended effort, both psychologically and financially.

Hardy investigated, by means of a questionnaire, the sources of information used by Forest Service Practitioners in the United States and their reasons for using those sources. Based on preliminary field interviews, he identified five factors that are used by these practitioners to evaluate information source preference.

1) ease of use - how easily the source can be used to access the information needed,

2) time-saving ability - how much time a source can save by providing the needed information,
3) relevance - how much useful information is provided by the source,
4) selectivity - how precise the source is in weeding out exactly what information is wanted, and
5) promptness - how much time it takes to deliver the information (p. 291).

Questionnaire responses were subjected to factor analysis in order to determine whether the factors were independent. It was discovered that factors one, two, and five correlated highly, and factors three and four correlated highly. Hardy labelled the two derived factors 'speed' and 'content'. Regression analysis of the two derived factors revealed that 'speed' was given much greater weight by the practitioners in choosing between information sources. Hardy concluded that "ease of accessing information has greater importance to information seekers than the amount of quality of information available" (p. 292). However, content was still an important consideration. Hardy noted that the quality of information must be maintained at the same time that its accessibility is improved.

Other factors, particularly psychological ones, may also play a role in determining an individual's choice of information source. Dunn (1984), as noted above, argued that beyond the pragmatic considerations of accessibility and ease of use, there were psychological factors which influence an individual's selection of one source of information over another. Consequently, both of these factors, the pragmatic and the psychological, were investigated in the present study within the context of information seeking by undergraduate students.

D. PSYCHOLOGICAL ASPECTS OF INFORMATION SEEKING

Although it is clear that individuals actively seek information, it is not immediately obvious why and when they are motivated to do so. Few researchers in library and information science have investigated the motivational aspects of information seeking behavior; however, this topic has received considerable attention in the area of psychology. For the most part, these studies have concentrated on the psychological variables of approach and avoidance tendencies and generalized drives.

Feather (1967) maintained that information seeking behavior is a result of approach and avoidance tendencies. He argued that people seek out information which is consistent with their previous beliefs and views, and avoid information which challenges their opinions. Therefore, people tend to pursue consistency and to avoid inconsistency.

Studies of generalized drive in human beings have concentrated on the need for control. Rotter (1966) developed the internal versus external control of reinforcement scale (I-E). It refers to the extent to which people feel that they have control over the reinforcements which occur relative to their behavior. Internal individuals believe that they control their own destiny and reinforcements while external individuals feel they do not have such control. This was termed "locus of control" (Rotter, 1966). Based on Rotter's model, DeVito, Bogdanowicz and Reznikoff (1982) investigated the health-related information seeking of students and "health locus of control". The researchers discovered that individuals with an internal health locus of control orientation and a high health concern expressed a desire to obtain a greater mean number of health-related pamphlets than did people with an external orientation or a low health concern.

Other researchers have considered the psychological apsects of why people seek information in a different light. Parker and Paisley (1966), mentioned previously, conducted a study of the information seeking patterns of the general public. In addition to researching the types of information sources consulted, two psychological variables were studied: "achievement motivation" and "need for affiliation". They attempted to determine the relationship between these psychological factors and the extent and kind of information seeking activity exhibited by the public.

"Achievement motivation" was defined by Parker and Paisley as the need to accomplish or master something difficult. They described people with a high need for affiliation as those who desire to do things in the company of others. The researchers examined the behavior of achievement-oriented individuals in the context of mass media usage and participation in adult education programs. It was discovered that the achievement-oriented individuals were high users of the print media. High achievement-oriented people generally used media for social contact or relaxation but used books specifically for finding information more frequently than did low achievement-oriented people. In the area of adult education, the results indicated that achievement-oriented people had a higher rate of participation and used adult education for vocational purposes.

The researchers found that a high level of education was necessary in order for a positive relationship to exist between the need for affiliation and information seeking through interpersonal sources. They concluded that achievement motivation and need for affiliation are determining factors in some peoples' quest for information.

Other researchers (Zweizig, 1973; O'Connor, 1978; Boone, 1980) have also suggested that motivational needs and variables play an important role in information seeking behavior. Most recently, Dunn (1984) has addressed this issue.

Dunn (1984), referred to earlier in the subsection on student information seeking, conducted a study to determine which psychological needs influence undergraduate students to seek information beyond course requirements. Rather than concentrating on such concepts as approach and avoidance tendencies, locus of control, or achievement and affiliation, her theoretical foundation was based on need theory as described by the psychologists Lewin, Murray, Alderfer, and Maslow. "Need theory" is concerned with the subjective experiences of people as they interact with a complex environment (Alderfer, 1972).

Lewin (1938) provided only a generalized view of psychological needs, while Murray (1938) suggested a taxonomy of needs. Maslow (1954), however, developed a hierarchy of needs divided into five categories: physiological needs, safety needs, love and belongingness needs, esteem needs, and needs for self-actualization. He contended that all needs are inate and are ordered according to prepotency, or influence, with physiological needs being the most prepotent.

Alderfer (1972) developed an "ERG theory" of needs based on Maslow's hierarchy. Alderfer collapsed the five categories into three: existence (E), relatedness (R), and growth (G). He theorized that existence needs include physiological and material desires, while relatedness needs deal with interpersonal relationships, and growth needs are comprised of factors that influence one to produce a creative or productive effect on oneself and on the environment. Dunn (1984) postulated that the psychological needs which influence undergraduate students to seek information would fall into the Maslow/Alderfer categories.

Dunn identified 61 psychological needs, based on two sets of interviews with students. The psychological needs focussed on "family, friends, teachers and classmates, boyfriends or girlfriends, personal goals, and professional aspirations" (p. 70). Responses from her survey questionnaire were subjected to factor analysis, which resulted in six hypothetical "need factors":

Factor 1: Need for other approval,
Factor 2: Need for success in chosen profession,
Factor 3: Need for self-extension,
Factor 4: Need for self-approval,
Factor 5: Need for intellectual stimulation, and
Factor 6: Needs related to a successful college experience (p. 95).

The psychological need variables which correlated highest with each of the six need factors were included in that factor. It must be noted that not all need variables were included in the factor loadings. (See Table 1 for a summary of the factor analysis of the six need factors.)

The results indicated that the need for intellectual stimulation, factor 5, was the most influential in undergraduate students' search for information followed by followed by the need for self-approval, factor 4. The next most influential was the need for success in one's chosen profession, factor 2, the need for self-extension, factor 3, followed by the needs related to a successful college experience, factor 6, and the need for other approval, factor 1 (p. 95). Dunn maintained that students pursued an interest or problem encountered in class because they seek approval, knowledge, success, mental and spiritual challenge (p. 121). In addition, Dunn also maintained that these need factors related to and supported previous research in psychology, particularly that of Maslow's (1954) and Alderfer's (1972). As a result of Dunn's study, there is a basis for suggesting that information seeking is, in part, motivated by basic psychological needs. The present study explored this issue further.

TABLE 1
SUMMARY OF DUNN'S (1984) NEED FACTORS

FACTOR	VARIABLES
1: Need for Other Approval	- Need to have classmates think I'm smart - Need to have teacher think I'm smart - Need to compete with classmates for teacher's approval - Need to do more than is required for the class so that I can feel equal to my classmates - Need to have friends think I'm smart - Need to have teacher notice me - Need to prove myself to my husband/wife or boyfriend/ girlfriend
2: Need for Success in Chosen Profession	- Need to be well prepared for chosen profession - Need to be successful in chosen profession - Need to have broader understanding of the subjects that relate to my chosen profession - Desire for more information about my chosen profession - Need to meet requirements for employment in my chosen profession - Need to know wide variety of things so I can feel secure in terms of job market - Desire to compete better in job market
3: Need for Self-Extension	- Need to learn more about God - Need to know more so that when I have children I can do a better job of raising them - Desire to have a broader outlook toward life and people - Need to know more in order to help others - Need to become a whole person in terms of the mental, physical, and spiritual - Need to understand different people and their environments
4: Need for Self-Approval	- Desire to know and understand in order to feel better about myself - Need to avoid feeling frustrated by lack of knowledge - Need to live up to my expectations of myself - Need to feel intelligent - A feeling of insecurity when I think I should know something but I don't

5: Need for Intellectual Stimulation	- Enjoyment of learning for its own sake - Personal interest in subject of class - Inner drive to learn more about the subjects that make me curious - Need for the excitement and fun of finding answers - Personal satisfaction
6: Needs Related to a Successful College Experience	- Need to get my money's worth out of college - Need to get good grades - Need to feel that my parent's money is well spent on my college education - Need to get everything I can out of my college education - Need to know in order to do better in upcoming classes - Need to understand basic content of course

CHAPTER III

RESEARCH DESIGN

Two methods were used to gather data to answer the research questions and to test the study hypotheses posed in Chapter I. These data gathering methods were: a questionnaire survey, and critical incident interviews. Together, these methods produced a combination of both quantitative and qualitative information.

A. STUDY POPULATION

The subjects for this study were first-year and fourth-year undergraduate students registered in the Faculty of Agriculture and Forestry at the University of Alberta.

The Faculty of Agriculture and Forestry offers courses leading to four-year professional Bachelor of Science degrees. The areas of study include: Agriculture, Food Science, Forestry, Agricultural Business Management, Agricultural Engineering, and pre-Veterinary Medicine. The B.Sc. Agriculture program offers eleven specializations and a general route of study. The specializations include: agricultural economics, agronomy, animal science, dairy science, entomology, grazing managment, plant protection, plant science, poultry science, and soil science. Students also take courses from other faculties and departments in the University. In the Province of Alberta, the second, third, and fourth years of programs in Agriculture and Forestry are offered only at the University of Alberta; however a modified first-year program may be taken at the University of Calgary, at the University of Lethbridge, or at one of the affiliated Junior Colleges, such as Red Deer College or Grande

Prairie Regional College. The Faculty also offers a two-year pre-Veterinary Medicine program which may allow entrance to the four-year program in Veterinary Medicine at the Western College of Veterinary Medicine at the University of Saskatchewan in Saskatoon.

During the 1987-88 academic year, 751 undergraduate students were registered in the Faculty. A breakdown of the enrollment is found in Table 2.

Students registered in Forestry or any of the Agriculture specializations comprised the sample for the present study. In addition, students registered in the two-year Pre-Veterinary program were included in the study, as many of these students will complete a four-year Agriculture or Forestry degree if they are not admitted to a veterinary program. Students with majors in Food Science, Agricultural Business Management, and Agricultural Engineering were not included in the study. These programs have small enrollments and many of their courses are offered jointly with the Faculty of Home Economics, the Faculty of Business, and the Faculty of Engineering respectively. Students classified as special students were also excluded from the study.

Other studies have suggested that the greatest difference in library use is found between first-year (freshman) students and fourth-year (senior) students (Lane, 1966; Lubans, 1971). Accordingly, this study assumed that first-year and fourth-year students would demonstrate the greatest differences in both their information seeking behaviors and psychological motivations.

TABLE 2
UNDERGRADUATE ENROLLMENT BY PROGRAM, 1987-1988

PROGRAM	YEAR OF PROGRAM				
	First	Second	Third	Fourth	Total
*Agriculture	73	71	108	114	366
*Forestry	29	44	45	32	150
*Pre-Veterinary Science	39	39	-	-	78
Agricultural Engineering	13	13	5	13	44
Agricultural Business	-	-	-	5	5
Food Science	7	13	17	22	59
Special Students	-	-	-	49	49
Total	161	180	175	235	751

*Students in these programs only comprise the study's sample
Student enrollment figures for 1987-1988 provided by
the Assistant to the Dean of Agriculture and Forestry

B. QUESTIONNAIRE DEVELOPMENT

The questionnaire method of data gathering allows the researcher to survey a large sample of subjects in a relatively short period of time and to provide information regarding attitudes, beliefs, and behaviors (Kunz, 1977; Busha and Harter, 1980). Accordingly a questionnaire was used as the main survey instrument in the present study.

Based on previous studies and questionnaires, especially Dunn's (1984), and on consultations with the Area Coordinator and a science librarian at the Science and Technology Library at the University of Alberta, the questionnaire was developed according to four main sections:

1) course requirements and information sources,
2) psychological needs,
3) information problems and previous bibliographic instruction, and
4) demographic information.

Both structured and open-ended questions were included. Structured questions were designed to obtain quantitative data on the information seeking behaviors and the motivating needs of the students. Open-ended questions were designed to solicit qualitative data on why the respondents deemed certain information sources to be important, what problems they encountered during their search for information, and their evaluation of previous bibliographic instruction courses.

Two versions of the questionnaire were developed, one for the first-year students and one for the fourth-year students. (See Appendices A and B.) The two questionnaires only differed on one question. The first-year questionnaire excluded the question which asked where the respondents had taken their first year of Agriculture and Forestry.

A synopsis of the questionnaire follows.

Section 1: Course Requirements and Information Sources

The questions in this section related to:

1) Course Requirements - Students were asked to identify the course requirements for which they sought information during the previous semester, selecting from a list of eight pre-identified possibilities: assignments, labs, term papers, exams, seminars, beyond class requirements, other, and none.

2) Information Sources - Students were asked to indicate how important each information source was for each of the eight pre-identified course requirements, using a Likert-type rating scale. The list of information sources was based on Dunn's (1984) list, and revised on the basis of interviews during the pretesting of the questionnaire with graduate students specializing in Agriculture or Forestry. Students were also asked to identify the three most important information sources and the reasons why they considered these sources important.

Section 2: Psychological Needs

The questions in this section related to:

1) Psychological Needs - Students were asked to rate the extent to which certain psychological needs influenced them to search for information. Again, a Likert-type rating scale of influence was employed. Although these psychological needs were based on Dunn's (1984) list, the list developed for the present study was reduced from her 61 needs to 23 needs as identified through rigorous logical and conceptual analysis. (For a complete listing and

analysis of Dunn's need statements see Appendix C.) Some of Dunn's need statements were repetitious, so they were collapsed into a single statement. For example, three of Dunn's statements,

> "Need to have my friends think I'm smart",
>
> "Need to have the teacher think I'm smart",
>
> "Need to have classmates think I'm smart",

were grouped in the present study into one concept:

> "Need to have others think I'm smart".

Other need statements identified by Dunn were not conceptually distinct, so they were combined into mutually exclusive categories. For example, Dunn's statements,

> "Need to meet requirements for employment in chosen profession",
>
> "Need to be well prepared for chosen profession",
>
> "Need to know a wide variety of things so that I can feel secure in terms of the job market", and
>
> "A desire to compete better in the job market"

were reduced in the present study to one concept:

> "Need to compete better in the job market".

In addition, some of Dunn's need statements were in fact the means to achieving a need, not a need per se. Means and ends were conflated in such cases. For example, Dunn's statement,

> "Need to do more than is required for the class so that I can feel equal to my classmates",

consists of two separate concepts:

1) the need to feel equal to classmates, and
2) the means of achieving this need, that is, doing more than is required for the class.

This need statement was therefore reconceptualized in the present study as: "Need to feel equal to others".

Section 3: Information Problems and Previous Bibliographic Instruction

The questions in this section related to:

1) Information Problems - Students were asked if they had encountered any problems in finding and getting the information that they required.

2) Bibliographic Instruction - Students were asked if they had taken any courses, seminars, or lectures on how to find information, and whether these courses had been effective. The term "library instruction" was not used as it was desired that the students focus their responses on information seeking in general, not on library use in particular.

Section 4: Demographic Information

This section related to:

1) Demographic Data - This section asked for student characteristics such [illegible] sex, class status, and major area of study. Fourth-year students were asked at which institution they had completed their first year of Agriculture and Forestry. In addition, students were asked to indicate whether they had taken AGFOR 201, Introduction to Agriculture, and/or AGFOR 204, Practice in Communication. These are recommended courses and contain a bibliographic instruction component.

At the end of this section, students were asked if they would be willing to participate in a short follow-up interview. This was the method used for identifying volunteer subjects for the interview phase of the study.

A covering letter indicating the purpose of the study and the instructions that should be followed was attached to the front of the questionnaire. (See Appendix D.)

The draft questionnaire was pretested on 11 graduate students specializing in Agriculture or Forestry. In personal interviews with the pretest participants, each student was asked a standardized set of questions. (See Appendix E.) The students seemed to have difficulty following the original format and the wording of question 3, which referred to information sources used; therefore modifications were made. They also indicated that "seminars" should be added to the list of course requirements. With regard to the list of information sources, they suggested that "teaching assistant" should be included. The rest of the questionnaire did not pose any problems. The revised questionnaire was pretested on graduate students specializing in Library Science.

The final version of the questionnaire was reviewed and approved by the thesis supervisor and the internal member of the thesis committee. In addition, the questionnaire was given to the Dean of Agriculture and Forestry for his permission to distribute it to students in that Faculty.

C. QUESTIONNAIRE DISTRIBUTION

Several methods were used to distribute the questionnaires. These included: distribution in selected classes, distribution through the Students' Records Office of the Faculty of Agriculture and Forestry, and mail distribution.

The first method, distribution of the questionnaire in selected classes, took place from February 4 to February 12, 1988. Typically, mailed questionnaires do not have a high rate of response; therefore it was anticipated that a higher response rate would be achieved by distributing the questionnaire during class periods. The professor of each targeted course was contacted in advance to obtain permission to distribute the questionnaire during class time, and also to arrange a date for the distribution. All professors agreed to the proposed distribution procedure.

Various courses were selected in consultation with the Assistant to the Dean of Agriculture and Forestry. Courses were chosen on the basis of the largest enrollment of first-year and fourth-year students, but excluded courses concentrating on Food Science, Agricultural Business Management, and Agricultural Engineering. The selected courses included: AGFOR 204, Practice in Communication; FOR 210, Wildland Resources Measurements; AGFOR 451, Practical and Professional Agriculture; SOILS 460, Soils Fertility; INTERD 432, Forest Administration and Policy; and INTERD 486, Livestock and Meat Marketing.

Initially, the questionnaires were distributed at the beginning of each class period by the researcher. The first class in which the questionnaire was distributed took almost twenty minutes to complete. It was therefore decided that it would be less disruptive to the class to have the students hand in the completed questionnaires to the researcher at the end of the period, rather than at the point of immediate completion. The standardized verbal instructions produced by the researcher asked that the respondents base their answers on the previous semester, and to fill out only one questionnaire. At the same time, confidentiality of responses was assured. Furthermore, if a student had not attended university during the previous semester, he or she was requested not to participate in the study.

Because the response rate for first-year students was relatively low it was decided to increase the proportion of respondents by placing a large sign in the

Students' Records Office in the Agriculture and Forestry Building, and asking first-year students to pick up a questionnaire package. The package consisted of the student's name on the envelope, a revised covering letter, and the first-year questionnaire. (See Appendix F.) Students who had already completed the survey instrument in class were asked to indicate this on their package. However, only four completed questionnaires were obtained in this manner.

As it was impossible to ascertain which first-year students had completed the survey instrument during the class distribution phase, questionnaires were then mailed to all those not registered in AGFOR 204. Fifty-four questionnaires were mailed out and respondents were asked to bring the completed form to the Students' Records Office in the Agriculture and Forestry Building by March 2, 1988. (See Appendix G.)

Only five completed questionnaires were returned; however two of them were from students registered in Agricultural Engineering so they were not included in the analysis. In addition, three other questionnaires were returned indicating that these persons no longer lived at the addresses used. Therefore, only three usable questionnaires were obtained through the mail-out method.

D. INTERVIEWS

Wilson (1981) has suggested that qualitative research is an appropriate methodological approach to the study of information seeking behavior for the following reasons:

1) the researcher is concerned with uncovering the facts of the everyday life of the respondents,
2) by uncovering the facts, the researcher strives to understand the needs that motivate the individual to seek information,

3) by understanding the underlying needs, the role of information in everyday life may be understood, and
4) by having a better understanding of the user, the researcher should be able to design more effective information systems (p. 11).

Critical incident studies focus the respondent's attention on a specific incident or case from the recent past, and attempt to obtain a step-by-step record of behaviors for that event (Kunz, 1977; Flanagan, 1954). During the questionnaire phase of the present study, subjects were asked if they would be willing to participate in an interview at a later date. The students who indicated their willingness were then interviewed by telephone, using the critical incident technique described above. The qualitative data obtained from the interviews contributed to a more detailed and accurate description of the information seeking process of undergraduate students in the Faculty of Agriculture and Forestry.

The interview schedule was structured but allowed for unstructured and spontaneous responses to each question. (See Appendix H.) The respondent's questionnaire was used in conjunction with the interview, in order to verify for which course requirement the student had spent the most time trying to find information during the previous term.

The major sections of the interview schedule addressed:

1) Course Requirement - Students were asked if they remembered the course requirement they specified on the questionnaire, and to provide more details about it; for example, what class it was for, what did it consist of, format, and percentage of final grade. If they were not able to remember this course requirement, they were asked to focus on a course requirement from the

present term where they spent the greatest amount of time searching for information.

2) Information Seeking Steps - Students were asked to recount the steps they followed in order to find the required information. At times, based on the information sources listed on the questionnaire, probing statements were used because the students were not able to recall their information search process in its entirety. Subjects were also asked why they chose a certain information source and if they thought that they were able to get all the information needed in order to adequately complete the course requirement. Another question focused on the efficiency of the approach that students followed in trying to find information.

3) University of Alberta Library System - Students who indicated during the interview that they had used any of the university libraries, were asked what would be the most important change the university library system could implement in order to assist them in finding information more efficiently. If respondents indicated that they had not used any of the university libraries, they were asked reasons for not using them.

Eleven first-year students and 11 fourth-year students indicated that they would participate in interviews. All 22 respondents were telephoned, and the interview was conducted immediately by telephone, or a more convenient time was arranged if necessary.

Several attempts were made to reach all the prospective interviewees, but the researcher was not able to contact 2 students even after repeated telephone calls. One student set up an appointment time, but did not keep it. In total, then, 9 first-year students and 10 fourth-year students were interviewed. Interviews ranged from 7 minutes to 12 minutes, depending on how much information the subject was able to recall. The interviews were conducted between April 11 and April 18, 1988.

E. METHODS OF DATA ANALYSIS

A coding system was developed for data entry of questionnaire responses. Each questionnaire was assigned a unique three digit identification number and the coded responses to each question were entered into a computer line file. In order to analyze the data, three methods of data analysis were used: descriptive statistics, statistical testing of the null hypotheses, and manual analysis of the open-ended questions and critical incident interviews.

Descriptive statistics included frequencies and percentages for the variables first-year and fourth-year students, course requirements, information sources, psychological needs, and bibliographic instruction.

A number of statistical tests were employed in order to test the null hypotheses. T-tests were used to examine the differences between

1) the information sources chosen by first-year students and those chosen by fourth-year students,

2) the motivating psychological needs of first-year students and those of fourth-year students,

3) the information sources chosen by students who had been exposed to bibliographic instruction and students who had not been exposed to bibliographic instruction. Separate t-tests were conducted on several variables in order to examine these differences. The relevant questions from the questionnaire include whether the students had taken a bibliographic course, whether the students had taken AGFOR 201 and/or 204. And

4) the information sources chosen by fourth-year students and their academic institution of first-year attendance.

One-way analysis of variance was used to examine the relationship between course requirements and information sources chosen. This analysis was based on the aggregated multiple responses for each of these two variables. Responses of "did not use", "not important", and no response were grouped together and coded as "not important". In addition, responses of "none" and "other" were excluded. An F-test was also conducted with the one-way analysis of variance in order to determine which information sources had significant differences among their observed means of importance. These information sources would be significantly related to the type of course requirement.

As the sample sizes for each type of course requirement were not equal, the Scheffé method was used to make pairwise comparisons of the significantly related groups of course requirements for each information source. Each course requirement was compared with the other course requirements for each of the information sources chosen by the respondents.

A Pearson's Product Moment Correlation Coefficient test was conducted to determine whether a relationship existed between information sources chosen and influencing psychological needs. The test was conducted individually for each of the six identified course requirements.

Open-ended questions were analyzed manually by copying the responses verbatim from the questionnaire, and analyzing these transcripts for general patterns and trends as well as for unique responses. The information received from the telephone interviews were treated in the same manner.

CHAPTER IV

DATA ANALYSIS

This chapter presents the responses from the student questionnaires and the results of the critical-incident telephone interviews with selected students. Results are discussed in light of the research questions and research hypotheses posed by the study.

The first part of the chapter presents the quantitative data obtained from respondents by means of the questionnaire. Descriptive statistics about course requirements, information sources, and psychological needs are discussed. Statistics reporting means, standard deviations, comparative percentages, and rankings are presented in tables and graphs. In addition, appropriate statistical tests -- one-way analysis of variance, Scheffé procedure, Pearson product-moment correlation, and t-tests -- are presented in order to test each of the null forms of the research hypotheses. A statement of acceptance or rejection of each null hypothesis is given, followed by a statement of acceptance or rejection of each research hypothesis. The significance of the relationships and differences are explored.

The second section of this chapter analyzes the reponses to the open-ended questions from the questionnaire and the results of the critical incident interviews.

A. RESPONSE RATE

In the present study, it is difficult to determine a meaningful response rate based on the number of questionnaires distributed in the selected classes, because some of the respondents were registered in the second or third year of

Agriculture and Forestry. Hence, their questionnaires, although completed and returned to the investigator, could not be included in the sample. In addition, some students may have been registered in more than one of the selected classes in which the questionnaire was distributed. Because of these problems, an exact total of distributed questionnaires to first-year and fourth-year students only is impossible to calculate. As a result, the response rate for the study was based on the total enrollment of first-year and fourth-year students in Agriculture, Forestry, and the pre-Veterinary program. One hundred and twenty-six usable questionnaires were returned, 57 from first-year students and 69 from fourth-year students. A response rate of 40 percent for first-year students and 47 percent for fourth-year students was calculated, as illustrated in Table 3. The combined response rate for both groups of students was 44 percent.

TABLE 3
RESPONSE RATE TO QUESTIONNAIRE

YEAR OF PROGRAM	QUESTIONNAIRES RETURNED	STUDENT ENROLLMENT	RESPONSE RATE
First	57	141	40 %
Fourth	69	146	47 %
Total	126	287	44 %

B. QUANTITATIVE DATA

Quantitative data findings are presented in four parts: course requirements, information sources, psychological needs, and bibliographic instruction and demographic data.

1) Course Requirements

The first section of the questionnaire asked the students to indicate for which types of course requirements they sought information. Table 4 shows that first-year students most frequently sought information for the course requirement assignments (79 percent of respondents). Table 5 shows fourth-year students most frequently sought information for the course requirement term papers (93 percent). It is interesting to note that 89 percent of fourth-year students sought information for assignments. This is an even greater proportion than for first-year students. It must be noted that only 37 percent of first-year respondents stated that they sought information for term papers.

Of the first-year students, only 42 percent sought information for labs and 5 percent for seminars. This can be compared with the fourth-year subjects, 68 percent of whom sought information for labs and 33 percent for seminars. It is also interesting to note that only 5 of the 126 respondents reported that they did not seek information for any course requirement. These 5 students were in the first year of their program. Figure 2 provides a comparison of the course requirements for which first-year and fourth-year students sought information.

Respondents were also asked to indicate the single course requirement for which they spent the most time trying to find information. Table 6 shows that first-year students spent the most time searching for information for assignments (47 percent), while fourth-year students spent the most time searching for information for term papers (49 percent). Figure 3 provides a comparison of the course requirements for which the respondents spent the most time seeking information.

TABLE 4
COURSE REQUIREMENTS FOR WHICH INFORMATION WAS SOUGHT BY FIRST-YEAR STUDENTS

COURSE REQUIREMENTS		FIRST-YEAR STUDENTS			
		Yes	No	No Response	Total
Assignments	#	45	10	2	57
	%	79	17	4	100 %
Labs	#	24	31	2	57
	%	42	54	4	100 %
Term Papers	#	21	34	2	57
	%	37	59	4	100 %
Exams	#	17	38	2	57
	%	30	66	4	100 %
Seminars	#	3	52	2	57
	%	5	91	4	100 %
Beyond Class	#	5	50	2	57
	%	9	87	4	100 %
Other	#	2	53	2	57
	%	4	92	4	100 %
None	#	5	50	2	57
	%	9	87	4	100 %

TABLE 5
COURSE REQUIREMENTS FOR WHICH INFORMATION WAS SOUGHT BY FOURTH-YEAR STUDENTS

COURSE REQUIREMENTS		FOURTH-YEAR STUDENTS			
		Yes	No	No Response	Total
Assignments	#	61	7	1	69
	%	89	10	1	100 %
Labs	#	47	21	1	69
	%	68	31	1	100 %
Term Papers	#	64	4	1	69
	%	93	6	1	100 %
Exams	#	21	47	1	69
	%	31	68	1	100 %
Seminars	#	23	45	1	69
	%	34	65	1	100 %
Beyond Class	#	13	55	1	69
	%	19	80	1	100 %
Other	#	4	64	1	69
	%	6	93	1	100 %
None	#	0	68	1	69
	%	0	99	1	100 %

FIGURE 2
COMPARISON OF THE COURSE REQUIREMENTS FOR WHICH INFORMATION WAS SOUGHT BY FIRST-YEAR AND FOURTH-YEAR STUDENTS

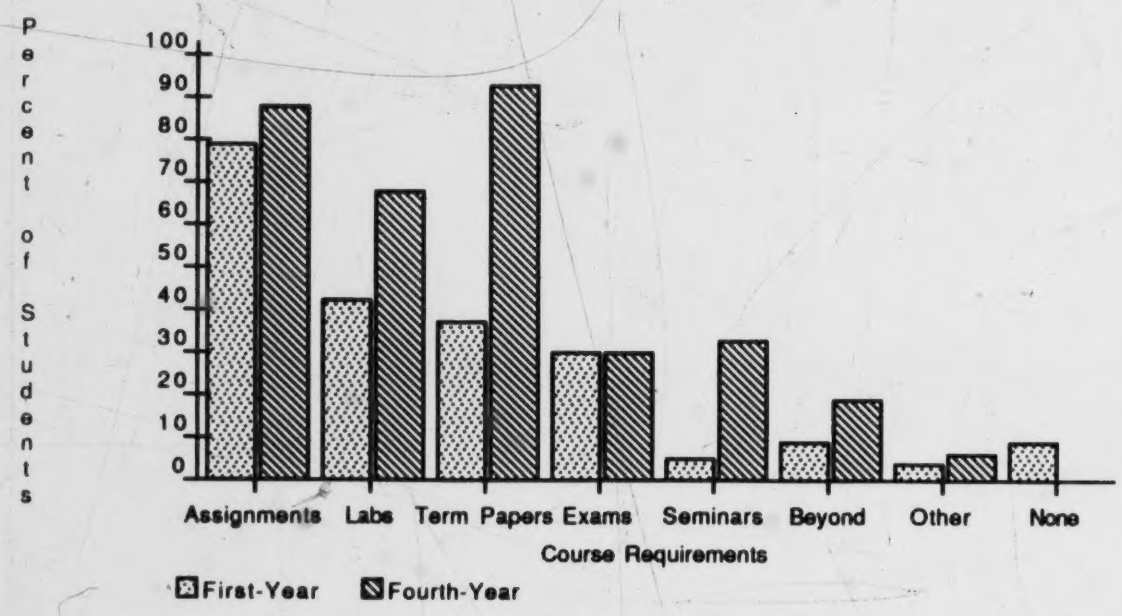
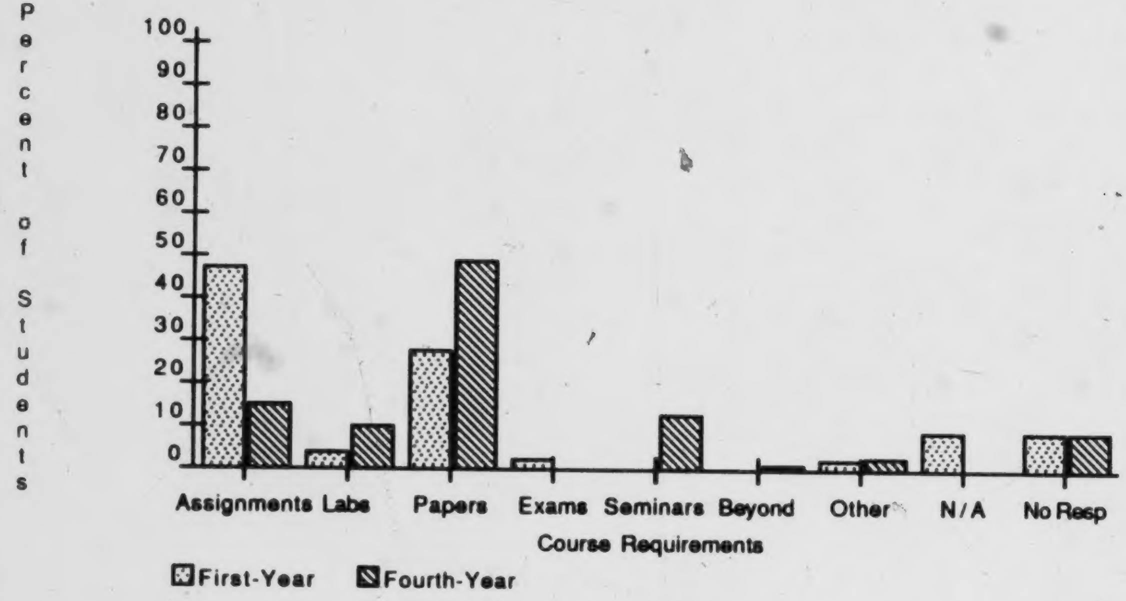


TABLE 6
COURSE REQUIREMENTS FOR WHICH STUDENTS SPENT THE MOST TIME SEEKING INFORMATION

COURSE REQUIREMENTS	FIRST-YEAR STUDENTS		FOURTH-YEAR STUDENTS	
	Number	Percent	Number	Percent
Assignments	27	47 %	10	15 %
Labs	2	3	7	10
Term Papers	16	28	34	49
Exams	1	2	0	0
Seminars	0	0	9	13
Beyond Class	0	0	1	1
Other	1	2	2	3
Not Applicable	5	9	0	0
No Response	5	9	6	9
Total	57	100 %	69	100 %

FIGURE 3
COMPARISON OF THE COURSE REQUIREMENTS FOR WHICH
STUDENTS SPENT THE MOST TIME SEEKING INFORMATION



Discussion

The data suggest that first and fourth year course requirements differ. First-year courses relied most heavily upon assignments, while fourth-year courses were comprised of a variety of course requirements. This is supported by course descriptions from the Faculty of Agriculture and Forestry. As the first-year curriculum depends generally on assignments, it is predictable that first-year students spent the greatest amount of their time seeking information for those assignments. Similarly, since the fourth-year program relies most heavily on term papers, fourth-year students spent the largest amount of their time seeking information for term papers. Typically, term papers rely on printed published material for information, and such information searching is usually time-consuming.

Almost all students reported that they sought information for course requirements. This emphasizes that students normally utilize some kind of information source in order to successfully complete their programs of study. It is also interesting to note that proportionately few students, 9 percent of those in first-year and 19 percent of those in the fourth, sought information beyond course requirements. This result may be compared to Dunn's (1984) study where all participants went beyond course requirements seeking information. Student information seeking in the present study, therefore, appears to be motivated primarily by their academic programs, rather than by other factors.

2) Information Sources

Students were asked to indicate which information sources were important for each type of course requirement. Table 7 gives the total number of responses for each type of course requirement. The numbers on Table 7 represent first-year and fourth-year student responses combined. A total of 355

TABLE 7
TOTAL NUMBER OF RESPONSES FOR EACH COURSE REQUIREMENT

COURSE REQUIREMENTS	RESPONSES PER COURSE REQUIREMENT	
	Number	Percent
Assignments	106	30 %
Labs	71	20
Term Papers	85	24
Exams	38	11
Seminars	26	7
Beyond Class	18	5
Other	6	2
None	5	1
Total	355	100 %

responses for all course requirements was obtained. The greatest number of students sought information for assignments, 106, with the next most frequent course requirement being term papers, 85 respondents, followed by labs, 71 respondents.

As previously mentioned, 5 students indicated that they did not seek information for any course requirement. These 5 students were not included in the analysis of the importance of information sources, therefore a total of 350 combined responses was used in Table 8.

Table 8 illustrates the degree of importance assigned by students to each information source. The data represent the total number of ratings for each information source, regardless of type of course requirement for which information was sought. The responses 'not important' and 'did not use' were grouped together for analysis as it was thought that if a student did not use an information source, it was considered to be unimportant. Sixty-three percent of the respondents indicated that the university library was a very important source of information. An additional 23 percent suggested that it was moderately important. The public library, bookstore, family member, and expert in the field were either considered to be not important, or were not used by the respondents.

Students were also asked to indicate their three most important sources of information for course requirements. Grouped responses are presented in Table 9.

The data show that 22 percent of first-year students and 25 percent of fourth-year students considered the university library to be one of their three most important sources of information. This is consistent with the results that show the university library was ranked very important by students more often than other course requirements. Similarities in the perceived importance of

TABLE 8
IMPORTANCE OF INFORMATION SOURCES CHOSEN BY FIRST-YEAR AND FOURTH-YEAR STUDENTS COMBINED

INFORMATION SOURCE	DEGREE OF IMPORTANCE									
	Very Important		Moderately Important		Not Important/ Did Not Use		No Response		Total	
	#	%	#	%	#	%	#	%	#	%
Public	13	4	29	8	299	85	9	3	350	100
Special	58	16	97	28	188	54	7	2	350	100
Department	86	25	92	26	165	47	7	2	350	100
University	219	63	81	23	50	14	0	0	350	100
Expert	40	11	82	24	220	63	8	2	350	100
Professor	77	22	139	40	131	37	3	1	350	100
TA	54	15	109	31	185	53	2	1	350	100
Family	18	5	44	13	278	79	10	3	350	100
Friend	50	14	126	36	172	49	2	1	350	100
Personal	99	28	129	37	113	32	9	3	350	100
Bookstore	11	3	30	9	288	82	21	6	350	100
Other	7	2	7	2	162	46	174	50	350	100

TABLE 9
GROUPED RESPONSES OF THE THREE MOST IMPORTANT INFORMATION SOURCES CHOSEN BY FIRST-YEAR AND FOURTH-YEAR STUDENTS

INFORMATION SOURCES	FIRST-YEAR STUDENTS		FOURTH-YEAR STUDENTS	
	Number	Percent	Number	Percent
Public	2	1 %	2	1 %
Special	4	2	18	9
Department	1	1	30	14
University	37	22	51	25
Expert	2	1	5	2
Professor	15	9	24	12
TA	9	5	4	2
Family	7	4	2	1
Friend	14	8	12	6
Personal	21	12	21	10
Bookstore	1	1	0	0
Other	3	2	2	1
Not Applicable	15	9	0	0
No Response	40	23	36	17
Total	171	100 %	207	100 %

other information sources for first-year students and fourth-year students are evident: 12 percent of first-year and 10 percent of fourth-year students suggested that their personal library was among the three most important information sources; 9 percent of first-year students and 12 percent of fourth-year students indicated that professor was important; and 8 percent of first-year and 6 percent of fourth-year students rated a friend and classmate among the three most important information sources.

A striking difference between the responses of first-year and fourth-year students to the question of perceived importance of the three most important information sources is found with the special library and the department library. Of the first-year students, only 2 percent considered the special library, and 1 percent considered the department library to be among the three most important information sources. This may be contrasted with 9 percent and 14 percent for fourth-year students, respectively. Figure 4 provides a visual comparison of these data.

i) Hypothesis 1

This research hypothesis predicted a significant relationship between the information sources chosen by students and type of course requirements.

On the basis of the data, the null hypothesis was rejected; therefore, the research hypothesis was supported. (See Table 10.)

In order to determine whether a relationship existed between the information sources chosen by students and type of course requirement, a one-way analysis of variance was conducted. The purpose of analysis of variance is to determine the probability that the means of several groups of scores deviate from one another merely by sampling error. This analysis was based on aggregated multiple responses for each of the two variables, course

FIGURE 4
COMPARISON OF THE MOST IMPORTANT INFORMATION SOURCES
CHOSEN BY FIRST-YEAR AND FOURTH-YEAR STUDENTS

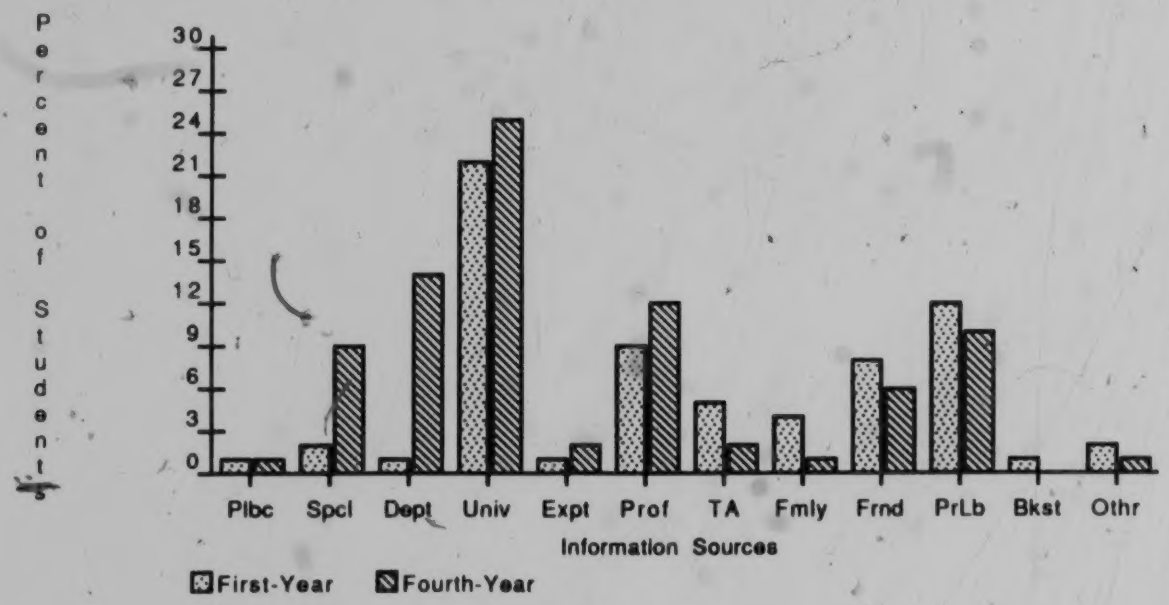


TABLE 10
ANALYSIS OF THE RELATIONSHIP BETWEEN
COURSE REQUIREMENTS AND INFORMATION SOURCES
CHOSEN BY STUDENTS

INFORMATION SOURCES	MEAN IMPORTANCE OF INFORMATION SOURCES FOR COURSE REQUIREMENTS												PROBABILITY		
	Assignments G1 N=106		Labs G2 N=71		Term Papers G3 N=85		Exams G4 N=38		Seminars G5 N=26		Beyond Class G6 N=18		F-Ratio	P	Scheffé Test Significantly Different Groups*
	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.			
Public	1.20	.47	1.08	.33	1.16	.51	1.11	.39	1.04	.20	1.39	.70	2.01	.0765	none
Special	1.61	.72	1.34	.58	1.91	.84	1.31	.62	1.58	.81	1.67	.84	5.98	.0000	G3-G4, G3-G2
Department	1.72	.78	1.58	.77	1.94	.88	1.42	.72	1.77	.76	1.83	.92	2.88	.0145	G3-G4
University	2.59	.61	2.30	.78	2.59	.74	1.80	.81	2.53	.81	2.44	.70	8.41	.0000	G1-G4, G3-G4, G5-G4, G6-G4, G2-G4
Expert	1.48	.65	1.37	.64	1.67	.81	1.24	.54	1.23	.51	1.33	.59	3.56	.0038	G3-G4
Professor	1.89	.69	1.77	.81	1.78	.73	1.80	.87	1.69	.68	1.67	.84	0.53	.7539	none
TA	1.50	.67	2.01	.78	1.44	.66	1.53	.76	1.50	.71	1.28	.57	7.23	.0000	G2-G6, G2-G3, G2-G1, G2-G5, G2-G4
Family	1.25	.59	1.14	.42	1.18	.44	1.13	.47	1.04	.20	1.39	.70	1.68	.1383	none
Friend	1.76	.68	1.85	.75	1.48	.65	1.73	.83	1.38	.64	1.56	.70	3.48	.0044	G2-G3
Personal	2.08	.76	1.79	.77	1.84	.80	2.03	.94	1.46	.65	2.06	.64	3.57	.0037	G1-G5
Bookstore	1.11	.35	1.03	.17	1.12	.42	1.21	.58	1.00	.00	1.17	.38	1.86	.1015	none

*P significant at .10

Mean Importance Scale: 1.00 not important
2.00 moderately important
3.00 very important

requirements and information sources chosen. Referring back to Table 7, a total of 355 responses was obtained. The 6 responses of 'other' and 5 respones of 'none' were not included in the one-way analysis of variance. Therefore, the total number of responses for course requirements was 344 for the one-way analysis of variance.

An F-test was conducted with the one-way analysis of variance. As the observed F ratio becomes larger, the probability becomes smaller that an F value of this size would be obtained merely by chance. Table 10 reports the F ratios and the resulting probability. It can be seen that the special libary, department library, university library, expert in the field, teaching assistant, friend and classmate, and personal library had significant differences among their observed means of importance. In other words, these information sources were significantly related to the type of course requirement. The research hypothesis that a relationship existed between the information sources chosen by students and type of course requirement is supported by these data. The public library, professor, family member, and bookstore were not significantly related to the type of course requirement.

The final column of Table 10 identifies significantly different groups of course requirements, using the Scheffé method. The Scheffé method enables one to make pairwise comparisons and is used when the sample sizes are not equal. The Scheffé method is more rigorous than other related procedures, and it leads to fewer significant results. Accordingly, Ferguson (1969) notes that "because this is so, the investigator may choose to employ a less rigorous significance level in using the Scheffé procedure; that is, the .10 level may be used instead of the .05 level" (p. 269). This follows Scheffé's own recommendation.

Each course requirement was compared with the other course requirements for each of the information sources chosen by respondents. The results indicate that term papers differed significantly from labs and exams in importance for the information source special library. That is, students considered the special library to be a more important source of information for term papers than for labs or exams. Term papers differed significantly from labs in importance for department library. For the source, university library, all course requirements differed significantly in importance from exams. Students did not choose the university library as a source of information for exams. An expert in the field was likely to be chosen for term papers but not for labs. A teaching assistant was significantly more important to students for labs than for other course requirements. A friend or classmate were more important sources of information to students for labs than for term papers, while one's personal library was more important for assignments than for seminars.

Table 10 also presents the mean importance of each information source for each course requirement. The table shows that the university library was the most important source of information for all types of course requirements. A student's personal library was also considered to be an important source of information for assignments, exams, and beyond course requirements. A teaching assistant was important for information concerning labs. The public library and bookstore were not important sources of information for any type of course requirement. These data are consistent with the data obtained from the Scheffé method.

ii) Hypothesis 2

This research hypothesis predicted a significant difference between the information sources chosen by first-year and fourth-year students.

On the basis of the data, the null hypothesis was partially rejected; therefore, the research hypothesis was partially supported. (See Tables 11 through 16.)

The first hypothesis -- supported by the data -- affirmed the existence of a relationship between information source chosen and type of course requirement. In light of this relationship, all subsequent statistical testing was conducted according to course requirement, so that this variable was held constant. The difference between information sources chosen by first-year and fourth-year students was analysed using a two-tailed t-test. The results are presented in Tables 11 through 16, one table for each course requirement.

Table 11 suggests that the information sources special library, department library, expert in the field, teaching assistant, and family member differed signficantly in importance between first-year students and fourth-year students for the course requirement assignments. The special library, department library, expert in the field , and teaching assistant were more important sources of information for fourth-year students than for first-year students, while a family member was a more important information source for first-year students.

Table 12 indicates that the information sources department library, university library, expert in the field, and professor differed significantly in importance between first-year and fourth-year students, for the course requirement labs. These information sources were more important to fourth-year students.

The results in Table 13 suggest that the information sources special library, department library, and professor differed significantly in importance between first-year and fourth-year students for the course requirement term

TABLE 11
DIFFERENCE BETWEEN INFORMATION SOURCES CHOSEN BY FIRST-YEAR (N=47) AND FOURTH-YEAR (N=62) STUDENTS FOR ASSIGNMENTS

INFORMATION SOURCES	YEAR OF PROGRAM	MEAN IMPORTANCE	STANDARD DEVIATION	t-VALUE	P
Public	First	1.30	.59	1.95	.055
	Fourth	1.11	.32		
Special	First	1.30	.62	-4.17	.000
	Fourth	1.84	.71		
Department	First	1.19	.45	-7.98	.000
	Fourth	2.11	.75		
University	First	2.53	.62	-0.80	.426
	Fourth	2.63	.63		
Expert	First	1.26	.49	-3.50	.001
	Fourth	1.66	.72		
Professor	First	1.87	.74	-0.35	.728
	Fourth	1.92	.66		
TA	First	1.34	.64	-2.38	.019
	Fourth	1.65	.68		
Family	First	1.43	.72	2.80	.007
	Fourth	1.11	.32		
Friend	First	1.79	.75	0.58	.561
	Fourth	1.71	.64		
Personal	First	2.13	.82	0.43	.666
	Fourth	2.06	.70		
Bookstore	First	1.09	.28	-0.69	.492
	Fourth	1.13	.38		

Mean Importance Scale:
1.00 not important
2.00 moderately important
3.00 very important

TABLE 12
DIFFERENCE BETWEEN INFORMATION SOURCES CHOSEN BY FIRST-YEAR (N=26) AND FOURTH-YEAR (N=48) STUDENTS FOR LABS

INFORMATION SOURCES	YEAR OF PROGRAM	MEAN IMPORTANCE	STANDARD DEVIATION	t-VALUE	P
Public	First	1.04	.20	-1.00	.323
	Fourth	1.10	.37		
Special	First	1.15	.46	-1.91	.060
	Fourth	1.42	.61		
Department	First	1.15	.54	-4.46	.000
	Fourth	1.85	.80		
University	First	1.92	.89	-3.18	.002
	Fourth	2.50	.65		
Expert	First	1.15	.46	-2.42	.018
	Fourth	1.48	.68		
Professor	First	1.35	.69	-3.91	.000
	Fourth	2.06	.78		
TA	First	2.15	.78	0.91	.364
	Fourth	1.98	.79		
Family	First	1.27	.60	1.67	.105
	Fourth	1.06	.25		
Friend	First	1.81	.80	-0.25	.803
	Fourth	1.85	.74		
Personal	First	1.69	.84	-0.85	.395
	Fourth	1.85	.74		
Bookstore	First	1.15	.54	1.02	.318
	Fourth	1.04	.20		

Mean Importance Scale:
1.00 not important
2.00 moderately important
3.00 very important

TABLE 13
DIFFERENCE BETWEEN INFORMATION SOURCES CHOSEN BY FIRST-YEAR (N=22) AND FOURTH-YEAR (N=65) STUDENTS FOR TERM PAPERS

INFORMATION SOURCES	YEAR OF PROGRAM	MEAN IMPORTANCE	STANDARD DEVIATION	t-VALUE	P
Public	First Fourth	1.27 1.12	.63 .45	1.03	.313
Special	First Fourth	1.41 2.09	.80 .79	-3.52	.001
Department	First Fourth	1.27 2.17	.70 .82	-4.58	.000
University	First Fourth	2.59 2.60	.73 .75	-0.05	.961
Expert	First Fourth	1.50 1.74	.74 .83	-1.19	.237
Professor	First Fourth	1.41 1.91	.59 .74	-2.85	.005
TA	First Fourth	1.32 1.48	.65 .66	-0.98	.332
Family	First Fourth	1.27 1.14	.55 .39	1.06	.299
Friend	First Fourth	1.55 1.45	.67 .64	0.62	.535
Personal	First Fourth	1.64 1.92	.85 .78	-1.46	.147
Bookstore	First Fourth	1.09 1.12	.29 .45	-0.38	.703

Mean Importance Scale: 1.00 not important
2.00 moderately important
3.00 very important

TABLE 14
DIFFERENCE BETWEEN INFORMATION SOURCES CHOSEN BY FIRST-YEAR (N=18) AND FOURTH-YEAR (N=22) STUDENTS FOR EXAMS

INFORMATION SOURCES	YEAR OF PROGRAM	MEAN IMPORTANCE	STANDARD DEVIATION	t-VALUE	P
Public	First	1.11	.32	0.17	.869
	Fourth	1.09	.43		
Special	First	1.22	.55	-0.73	.471
	Fourth	1.36	.66		
Department	First	1.22	.65	-1.67	.104
	Fourth	1.59	.73		
University	First	1.72	.75	-0.54	.595
	Fourth	1.86	.89		
Expert	First	1.22	.55	-0.03	.977
	Fourth	1.23	.53		
Professor	First	1.50	.86	-2.02	.051
	Fourth	2.05	.84		
TA	First	1.50	.79	-0.36	.720
	Fourth	1.59	.80		
Family	First	1.22	.65	1.11	.280
	Fourth	1.05	.21		
Friend	First	1.78	.81	0.54	.595
	Fourth	1.64	.85		
Personal	First	1.67	.91	-2.51	.017
	Fourth	2.36	.85		
Bookstore	First	1.28	.67	0.79	.437
	Fourth	1.14	.47		

Mean Importance Scale:
1.00 not important
2.00 moderately important
3.00 very important

TABLE 15
DIFFERENCE BETWEEN INFORMATION SOURCES CHOSEN BY FIRST-YEAR (N=3) AND FOURTH-YEAR (N=24) STUDENTS FOR SEMINARS

INFORMATION SOURCES	YEAR OF PROGRAM	MEAN IMPORTANCE	STANDARD DEVIATION	t-VALUE	P
Public	First	1.00	.00	-0.35	.731
	Fourth	1.04	.20		
Special	First	1.00	.00	-1.29	.209
	Fourth	1.63	.78		
Department	First	1.00	.00	-2.01	.055
	Fourth	1.92	.78		
University	First	1.00	.00	-4.90	.000
	Fourth	2.75	.61		
Expert	First	1.00	.00	-0.80	.431
	Fourth	1.25	.53		
Professor	First	1.00	.00	-2.05	.051
	Fourth	1.79	.66		
TA	First	1.00	.00	-1.28	.213
	Fourth	1.79	.72		
Family	First	1.00	.00	-0.35	.731
	Fourth	1.04	.20		
Friend	First	1.00	.00	-1.08	.288
	Fourth	1.42	.65		
Personal	First	1.00	.00	-1.29	.209
	Fourth	1.50	.66		
Bookstore	First	1.00	.00	0.00	1.00
	Fourth	1.00	.00		

Mean Importance Scale: 1.00 not important
2.00 moderately important
3.00 very important

TABLE 16

DIFFERENCE BETWEEN INFORMATION SOURCES CHOSEN BY FIRST-YEAR (N=6) AND FOURTH-YEAR (N=14) STUDENTS FOR BEYOND COURSE REQUIREMENTS

INFORMATION SOURCES	YEAR OF PROGRAM	MEAN IMPORTANCE	STANDARD DEVIATION	t-VALUE	P
Public	First	1.00	.00	-1.59	.130
	Fourth	1.50	.76		
Special	First	1.83	.98	0.65	.524
	Fourth	1.57	.76		
Department	First	1.50	.84	-1.10	.284
	Fourth	2.00	.96		
University	First	2.50	.84	0.00	1.00
	Fourth	2.50	.65		
Expert	First	1.00	.00	-1.60	.127
	Fourth	1.43	.65		
Professor	First	1.00	.00	-2.39	.028
	Fourth	1.86	.86		
TA	First	1.00	.00	-1.36	.191
	Fourth	1.36	.63		
Family	First	1.67	.82	1.16	.262
	Fourth	1.29	.61		
Friend	First	1.17	.41	-1.72	.103
	Fourth	1.71	.73		
Personal	First	1.83	.98	-0.57	.592
	Fourth	2.07	.48		
Bookstore	First	1.17	.41	0.13	.898
	Fourth	1.14	.36		

Mean Importance Scale: 1.00 not important
2.00 moderately important
3.00 very important

papers. Each of these information sources was more important to fourth-year students than to first-year students.

Table 14 shows that the information source personal library was significantly more important for the course requirement exams for fourth-year students than for first-year students.

Table 15 suggests that the information source university library differed significantly in importance between first-year students and fourth-year students for the course requirement seminars. Fourth-year students considered the university library to be extremely important for seminars.

The data in Table 16 indicate that the information source professor was significantly more important for beyond course requirements for fourth-year students than for first-year students.

Discussion

The above results show that the type of course requirement influenced student choice of information source. The results obtained are, for the most part, what one would expect. One would predict that students would choose libraries as a source of information for term papers rather than for labs and exams. Term papers usually require a literature search which is best accomplished at a library. A teaching assistant usually teaches labs, therefore students would be expected to choose a teaching assistant for information regarding labs. It is surprising, however, that a professor was not a significantly important source of information for any type of class requirement, although students considered a professor to be important generally. Students, therefore, may approach a professor for more general information, rather than for course requirement information. In summary, the type of course requirement determined the type of information source chosen.

These results cannot be compared to the results of previous studies, as other studies have not investigated the relationship between course requirements and choice of information sources.

It was discovered that the university library was considered to be a very important information source by the majority of respondents. Personal library, department library, and professor were also considered to be very important sources of information. The information sources public library, bookstore, and family member were either not important, or the respondents did not choose them for information. These results, for the most part, support Dunn's (1984). In her study, students ranked teacher as the most important source in satisfying information needs, followed by college and university library, expert in the field, and personal library. In the present study, the university library was the most important, but expert in the field was rated by the majority of the respondents as not important or not used. Dunn had concluded that authoritative, informal sources are often chosen first, followed by authoritative, formal sources (p. 141). The data from the present study suggest that such a distinction cannot be made. Students chose not only formal sources, such as the university library and department library, but they also chose authoritative, informal sources such as professor and teaching assistant.

The present data may be compared to data from previous studies regarding the information seeking behavior of scientists and researchers. The subjects from the present study were in a scientific mission-oriented field, rather than in a technical field. These results are consistent with Allen's (1966) results. Allen discovered that scientists and technologists differ in their choice of information source: technologists chose informal sources more readily than formal sources. The reverse was true for scientists. The data in the present study suggest that the students deemed a formal source, the university library, as the most important information source for their course requirement information needs.

The results from the present study suggest that students were not concerned whether an information source was formal or informal, but rather their choice of information source was determined by the type of course requirement for which information was needed.

The data in Tables 11 through 16 suggest that some of the information sources chosen by first-year students and fourth-year students differed significantly in importance, as analysed in light of course requirements. Generally, fourth-year students considered special and department libraries to be significantly more important as information sources than did first-year students, while first-year students thought a family member to be a more important source of information than did fourth-year students.

These results suggest that fourth-year students were more aware of the different information sources available to them, than were first-year students. Many first-year students may not know that special and department libraries are available since their course requirements, usually assignments, do not demand that they seek information from other libraries. In addition, many first-year students are just out of high school, so may still be living at home; therefore, a family member as an information source may be more prominent for them than for fourth-year students.

These results are, in part, consistent with previous use and user studies. Previous studies have suggested that the greatest difference in library use is found between first-year and fourth-year students. Although both first-year students and fourth-year students stated that the university library was the most important information source, the subjects differed significantly in their perceived importance of other information sources. In summary, some significant differences existed between the information sources chosen by first-year students and fourth-year students.

3) Psychological Needs

Students were asked to rate the extent to which psychological needs influenced them to seek information using a rating scale of strong influence, moderate influence, and no influence. Tables 17 and 18 show the responses of first-year and fourth-year students, respectively. (For a complete representation of the data relating to psychological needs, see Appendix I.)

The tables reveal that students in both years rated "good grades" (N1) as the strongest influence on their search for information. The proportions were 61 percent of first-year students and 70 percent of fourth-year students. "Personal satisfaction" (N17) was also an influential psychological need for both groups, with 39 percent of first-year students and 45 percent of fourth-year students rating it as a strong influence.

Other needs which were considered to be of strong influence by both first-year and fourth-year students included: "knowing more about the subjects that interest one" (N5), "fulfilling personal goals' (N4), "feeling good about oneself" (N12), and "having a broader understanding of the subjects that relate to one's profession" (N21).

Table 19 provides a rank ordering of student ratings of psychological needs, comparing first-year students and fourth-year students. The Table shows only the strong influence ratings. For the most part, the rank ordering is very similar for both groups. The major difference in the ranks is for "getting everything one can out of one's university education" N3. This was ranked 7th by fourth-year students, but only 14th by first-year students. Another difference

TABLE 17
PSYCHOLOGICAL NEEDS INFLUENCING FIRST-YEAR STUDENTS TO SEEK INFORMATION

PYSCHOLOGICAL NEEDS		DEGREE OF INFLUENCE ON INFORMATION SEEKING									
		Strong		Moderate		None		No Response		Total	
		#	%	#	%	#	%	#	%	#	%
N1	Grades	35	61	13	23	2	4	7	12	57	100
N2	Outlook	1	2	29	51	19	33	8	14	57	100
N3	Education	5	9	33	58	10	17	9	16	57	100
N4	Goals	17	30	23	40	9	16	8	14	57	100
N5	Knowing	19	33	25	44	5	9	8	14	57	100
N6	Help Others	1	2	19	33	29	51	8	14	57	100
N7	Smart	1	2	11	19	37	65	8	14	57	100
N8	Exams	0	0	11	19	38	67	8	14	57	100
N9	Job	9	16	20	35	19	33	9	16	57	100
N10	Money	8	14	20	35	21	37	8	14	57	100
N11	Expect.	8	14	19	33	22	39	8	14	57	100
N12	Good	15	26	25	44	8	14	9	16	57	100
N13	Proving	4	7	16	28	29	51	8	14	57	100
N14	Person	2	4	17	30	28	49	10	17	57	100
N15	Frustration	9	16	33	58	7	12	8	14	57	100
N16	Professor	3	5	7	12	39	69	8	14	57	100
N17	Personal	22	39	23	40	5	9	7	12	57	100
N18	Better	13	23	23	40	12	21	9	16	57	100
N19	Ideas	1	2	16	28	32	56	8	14	57	100
N20	Secure	5	9	23	40	21	37	8	14	57	100
N21	Understand	13	23	25	44	10	17	9	16	57	100
N22	Mental	10	18	27	47	12	21	8	14	57	100
N23	Equal	6	10	17	30	25	44	9	16	57	100

TABLE 18
PSYCHOLOGICAL NEEDS INFLUENCING FOURTH-YEAR STUDENTS TO SEEK INFORMATION

PYSCHOLOGICAL NEEDS		DEGREE OF INFLUENCE ON INFORMATION SEEKING									
		Strong		Moderate		None		No Response		Total	
		#	%	#	%	#	%	#	%	#	%
N1	Grades	48	70	16	23	1	1	4	6	69	100
N2	Outlook	7	10	40	58	17	25	5	7	69	100
N3	Education	14	20	41	59	8	12	6	9	69	100
N4	Goals	31	45	28	41	5	7	5	7	69	100
N5	Knowing	33	48	29	42	2	3	5	7	69	100
N6	Help Others	6	9	32	46	25	36	6	9	69	100
N7	Smart	3	4	13	19	48	70	5	7	69	100
N8	Exams	3	4	6	9	53	77	7	10	69	100
N9	Job	14	20	31	45	19	28	5	7	69	100
N10	Money	6	9	17	25	41	59	5	7	69	100
N11	Expect.	9	12	28	41	28	41	4	6	69	100
N12	Good	22	32	36	52	7	10	4	6	69	100
N13	Proving	4	6	30	44	30	44	5	7	69	100
N14	Person	6	9	21	30	37	54	5	7	69	100
N15	Frustration	13	19	28	41	23	33	5	7	69	100
N16	Professor	2	3	23	33	40	58	4	6	69	100
N17	Personal	31	45	30	44	3	4	5	7	69	100
N18	Better	13	19	40	58	12	17	4	6	69	100
N19	Ideas	8	12	23	33	34	49	4	6	69	100
N20	Secure	10	15	29	42	25	36	5	7	69	100
N21	Understand	33	48	24	34	8	12	4	6	69	100
N22	Mental	13	19	36	52	16	23	4	6	69	100
N23	Equal	2	3	31	45	32	46	4	6	69	100

TABLE 19
RANK ORDERING OF PSYCHOLOGICAL NEEDS INFLUENCING STUDENTS TO SEEK INFORMATION

PSYCHOLOGICAL NEEDS		RANK MOST TO LEAST INFLUENTIAL	
		First-Year	Fourth-Year
N1	Grades	1	1
N17	Personal	2	5
N5	Knowing	3	2
N4	Goals	4	4
N12	Good	5	6
N18	Better	6	10
N21	Understand	7	3
N22	Mental	8	11
N9	Job	9	8
N15	Frustration	10	9
N10	Money	11	17
N11	Expect.	12	13
N23	Equal	13	23
N3	Eductation	14	7
N20	Secure	15	12
N13	Proving	16	19
N16	Professor	17	22
N14	Person	18	18
N2	Outlook	19	15
N6	Help Others	20	16
N7	Smart	21	20
N19	Ideas	22	14
N8	Exams	23	21

in the relative ranking is evident with "need to feel equal to others" N23 which was ranked 13th by first-year students and 23rd by fourth-year students.

i) Hypothesis 3

This research hypothesis predicted a significant difference between the motivating psychological needs of first-year and fourth-year students.

On the basis of the data, the null hypothesis was partially rejected; therefore, the research hypothesis was partially supported. (See Table 20.)

The difference between the motivating psychological needs of first-year students and fourth-year students was analyzed using a two-tailed t-test. Table 20 reveals that the following psychological needs were significantly more influential for fourth-year students than for first-year students:

1) having a broader outlook toward life and people (N2),
2) getting everything one can out of one's university education (N3),
3) fulfilling personal goals (N4),
4) knowing more about the subjects that interest one (N5),
5) being able to help others (N6),
6) challenging the ideas of the professor and asking more intelligent questions (N19), and
7) having a broader understanding of the subjects that relate to the profession (N21).

Table 20 also illustrates the mean influence and standard deviation for the psychological needs for both groups of respondents. Students reported that "getting good grades" (N1) was the most influential psychological need on information seeking. "Getting good grades" had a mean influence of 2.55 and 2.62 for first-year students and fourth-year students respectively. The mean

TABLE 20
t-TEST OF PSYCHOLOGICAL NEEDS AND YEAR OF PROGRAM

PSYCHOLOGICAL NEEDS		FIRST-YEAR N=57		FOURTH-YEAR N=69		PROBABILITY	
		Mean Influence	Standard Deviation	Mean Influence	Standard Deviation	t Value	P
N1	Grades	2.55	.76	2.62	.62	-1.36	.176
N2	Outlook	1.59	.53	1.78	.62	-2.30	.023
N3	Education	1.75	.61	2.00	.64	-2.19	.030
N4	Goals	2.00	.78	2.30	.71	-2.29	.024
N5	Knowing	2.11	.75	2.38	.67	-2.15	.033
N6	Help Others	1.37	.52	1.64	.64	-2.55	.012
N7	Smart	1.23	.46	1.28	.54	-0.52	.603
N8	Exams	1.19	.40	1.17	.48	0.24	.812
N9	Job	1.67	.74	1.86	.73	-1.43	.155
N10	Money	1.63	.72	1.42	.65	1.72	.087
N11	Expect.	1.61	.73	1.67	.70	-0.41	.680
N12	Good	1.96	.76	2.16	.68	-1.52	.130
N13	Proving	1.42	.63	1.55	.61	-1.18	.241
N14	Person	1.37	.56	1.48	.66	-1.00	.318
N15	Frustration	1.89	.65	1.78	.75	0.89	.374
N16	Professor	1.23	.54	1.39	.55	-1.68	.095
N17	Personal	2.18	.76	2.33	.68	-1.23	.220
N18	Better	1.86	.77	1.96	.65	-0.77	.445
N19	Ideas	1.32	.51	1.57	.70	-2.33	.022
N20	Secure	1.58	.63	1.71	.71	-1.07	.286
N21	Understand	1.89	.75	2.30	.75	-3.05	.003
N22	Mental	1.82	.71	1.90	.69	-0.59	.555
N23	Equal	1.51	.69	1.51	.56	0.01	.989

Mean Influence Scale:
1.00 no influence
2.00 moderate influence
3.00 strong influence

2

influence for the need "knowing more about the subjects that interest one" (N5) was 2.11 for first-year students and 2.38 for fourth-year students. In addition, the t-test demonstrated that this need differed significantly in influence for the two groups. The least influential need for both sets of students was "knowing for professional/ standardized exams and meeting professional school requirements" (N8).

ii) Hypothesis 4

This research hypothesis predicted a significant relationship between the information sources chosen by students and their motivating psychological needs.

On the basis of the data, the null hypothesis was partially rejected; therefore, the research hypothesis was partially supported. (See Tables 21 through 26.)

In order to determine whether a relationship existed between information sources and psychological needs, a Pearson's product moment correlation test was conducted. Again, as it was previously shown that course requirements influence the choice of information source, data are presented in light of each course requirement. Tables 21 through 26 show the significant relationships. To focus on the most important findings, only those variables that were significantly related to four or more other variables are discussed.

Table 21 illustrates the significant relationships between information sources and psychological needs for the course requirement assignments. The information sources teaching assistant and university library were significantly related to the most psychological needs. The psychological need "having a broader understanding of the subjects that relate to my profession" (N21), was significantly related to the most information sources.

TABLE 21
PEARSON CORRELATION COEFFICIENT
BETWEEN PSYCHOLOGICAL NEEDS AND INFORMATION SOURCE
FOR ALL STUDENTS FOR ASSIGNMENTS (N= 106)

PSYCHOLOGICAL NEEDS		INFORMATION SOURCES										
		Pblc	Spcl	Dept	Univ	Expt	Prof	TA	Fmly	Frnd	PrLb	Bkst
N1	Grades										.028	.000
N2	Outlook			.022	.049							
N3	Education							.001				
N4	Goals				.001			.000				.043
N5	Knowing											
N6	Help Others											
N7	Smart									.033		
N8	Exams									.029		
N9	Job											
N10	Money											
N11	Expect.								.008			
N12	Good				.017			.000				
N13	Proving		.035									
N14	Person			.046								
N15	Frustration						.025			.041	.028	
N16	Professor											
N17	Personal				.000			.043				
N18	Better				.013			.004			.023	
N19	Ideas			.044			.034	.004				
N20	Secure											
N21	Understand		.008	.012		.029		.038			.007	
N22	Mental							.000				
N23	Equal		.035									

only significant variables shown

TABLE 22
PEARSON CORRELATION COEFFICIENT BETWEEN PSYCHOLOGICAL NEEDS AND INFORMATION SOURCES FOR ALL STUDENTS FOR LABS (N= 71)

PSYCHOLOGICAL NEEDS		INFORMATION SOURCES										
		Pblc	Spcl	Dept	Univ	Expt	Prof	TA	Fmly	Frnd	PrLb	Bkst
N1	Grades								.025		.013	
N2	Outlook			.019								
N3	Education				.006			.004				
N4	Goals						.037	.001	.046			
N5	Knowing	.007						.026				
N6	Help Others											
N7	Smart											
N8	Exams			.001								
N9	Job			.009								
N10	Money							.016				
N11	Expect.							.040				
N12	Good	.045			.002		.031	.031	.029			
N13	Proving						.028					
N14	Person						.009					
N15	Frustration						.025	.004				
N16	Professor						.007					
N17	Personal						.027		.001			
N18	Better	.044		.012			.025	.047				
N19	Ideas			.009			.001					
N20	Secure						.017					
N21	Understand			.012			.037	.016				
N22	Mental			.018					.041			
N23	Equal											

only significant variables shown

TABLE 23
PEARSON CORRELATION COEFFICIENT BETWEEN PSYCHOLOGICAL NEEDS AND INFORMATION SOURCES FOR ALL STUDENTS FOR TERM PAPERS (N= 85)

PSYCHOLOGICAL NEEDS		INFORMATION SOURCES										
		Pblc	Spcl	Dept	Univ	Expt	Prof	TA	Fmly	Frnd	PrLb	Bkst
N1	Grades										.025	
N2	Outlook										.002	.043
N3	Education							.007				
N4	Goals				.023						.043	
N5	Knowing										.015	
N6	Help Others											
N7	Smart						.027					
N8	Exams			.037								
N9	Job											
N10	Money				.026							
N11	Expect.						.002	.009		.022		
N12	Good							.036				
N13	Proving						.041					
N14	Person		.047									.012
N15	Frustration						.030	.046				
N16	Professor						.043					
N17	Personal				.007				.037		.003	
N18	Better							.025				
N19	Ideas			.047			.007					
N20	Secure											
N21	Understand		.010			.026					.007	
N22	Mental							.027				
N23	Equal											

only significant variables shown

TABLE 24
PEARSON CORRELATION COEFFICIENT BETWEEN PSYCHOLOGICAL NEEDS AND INFORMATION SOURCES FOR ALL STUDENTS FOR EXAMS (N= 38)

PSYCHOLOGICAL NEEDS		INFORMATION SOURCES										
		Pblc	Spcl	Dept	Univ	Expt	Prof	TA	Fmly	Frnd	PrLb	Bkst
N1	Grades							.045		.001		
N2	Outlook							.039				
N3	Education			.035	.046							
N4	Goals			.009	.049			.003			.002	
N5	Knowing										.008	
N6	Help Others			.008				.018				
N7	Smart											
N8	Exams				.043							
N9	Job							.029				
N10	Money											
N11	Expect.			.002								
N12	Good			.009	.049							
N13	Proving											
N14	Person											
N15	Frustration			.003								
N16	Professor						.034					
N17	Personal			.020				.013			.004	
N18	Better				.025			.021				
N19	Ideas						.022	.024			.021	
N20	Secure							.023				
N21	Understand			.005			.048	.013			.000	
N22	Mental			.049			.013	.001				
N23	Equal											

only significant variables shown

TABLE 25
PEARSON CORRELATION COEFFICIENT BETWEEN PSYCHOLOGICAL NEEDS AND INFORMATION SOURCES FOR ALL STUDENTS FOR SEMINARS (N= 26)

PSYCHOLOGICAL NEEDS		INFORMATION SOURCES										
		Pblc	Spcl	Dept	Univ	Expt	Prof	TA	Fmly	Frnd	PrLb	Bkst
N1	Grades										.042	
N2	Outlook											
N3	Education											
N4	Goals		.026				.039					
N5	Knowing								.021			
N6	Help Others											
N7	Smart											
N8	Exams											
N9	Job											
N10	Money											
N11	Expect.											
N12	Good											
N13	Proving											
N14	Person	.015		.012				.047				
N15	Frustration						.042					
N16	Professor											
N17	Personal										.042	
N18	Better											
N19	Ideas											
N20	Secure										.038	
N21	Understand		.026	.017								
N22	Mental			.006								
N23	Equal											

only significant variables shown

TABLE 26
PEARSON CORRELATION COEFFICIENT BETWEEN PSYCHOLOGICAL NEEDS AND INFORMATION SOURCES FOR ALL STUDENTS FOR BEYOND COURSE REQUIREMENTS (N= 18)

PSYCHOLOGICAL NEEDS		INFORMATION SOURCES										
		Pblc	Spcl	Dept	Univ	Expt	Prof	TA	Fmly	Frnd	PrLb	Bkst
N1	Grades		.012									
N2	Outlook											
N3	Education								.022			
N4	Goals									.048		
N5	Knowing				.031							
N6	Help Others							.027		.009		
N7	Smart			.011								
N8	Exams											
N9	Job		.006									
N10	Money		.014					.018				
N11	Expect.											
N12	Good			.023					.012			
N13	Proving		.024									
N14	Person								.015			
N15	Frustration							.044		.002		
N16	Professor											
N17	Personal											
N18	Better		.009	.011	.018							
N19	Ideas							.027				
N20	Secure							.012				
N21	Understand											
N22	Mental								.014			
N23	Equal											

only significant variables shown